



MDOT-MSU
**Highway
Vegetation
Management
Four-Year
Summary
Report**

2013-2016



MISSISSIPPI STATE UNIVERSITY™
MS AGRICULTURAL AND
FORESTRY EXPERIMENT STATION

MDOT-MSU

HIGHWAY VEGETATION

MANAGEMENT

Four-Year Summary Report:

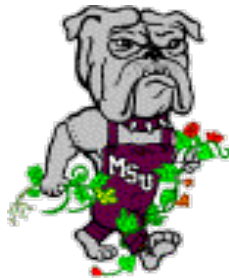
2013-2016

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Introduction

This report summarizes vegetation management studies initiated from 2013 to 2016. This summary report is prepared for the use of Mississippi Department of Transportation, industry cooperators, and colleagues. Information presented is neither product endorsement nor recommendation. This report is intended for private use and may not be reproduced.

Data are presented using Agricultural Research Manager® (ARM) software of Gylling Data Management, Brookings, SD. In 2016, ARM 7 was upgraded to ARM 9, thus data layout differs. Studies prior to page 202 are ARM 7 and studies after page 202 are ARM 9. Mean separations (indicated by letters) are provided in data tables where differences are significant. As a result of formatting in ARM 7, some columns are blank where data includes two application dates.

Application methods are noted for each experiment. Abbreviations which appear throughout this report are necessitated by the limited field lengths in the ARM software package. These may include abbreviated names not normally acceptable for cultivar names, etc. A glossary of weed species is provided at the end of the report.

Trade names are used throughout this report for clarity except where they are unavailable, then are identified by the experimental number and manufacturer. Since this is a summary report, some products evaluated under a number may now have a trade name. In this case, the trade name is placed in parenthesis after the number. Herbicide rates are usually expressed as active ingredient or product/acre unless otherwise noted. Within data tables, treatments involving more than one herbicide (product) are grouped together with the same treatment number. When treatments are comprised of more than one product, the additional product(s) within the treatment are preceded by "+" in the "Treatment Name" column.

Rainfall and temperature data may be obtained from the nearest NOAA Weather Station. City nearest the study location is provided near the beginning of each study.

Appreciation is expressed to members of the Mississippi Department of Transportation for their most gracious help and support. The authors would also like to thank the following industry cooperators for their support over the four-year period. They include Bayer Crop Science, DuPont, Dow AgroSciences, Helena Chemical Company, and Valent USA.

We would like to thank graduate students Nicole Barksdale and Maria Zaccaro and student workers Austin Braswell, Peter Ishola, Chris Maddox, and Jeremy Taylor for assistance with Roadside Vegetation Management Tours each spring and assistance with studies, where applicable.

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**Four-Year Summary Report:
2013-2016
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Summary of 2013 Research

MS Dot Standard Trials for Milestone and Opensight - Bahiagrass Analyses for Treatments 1-4

Protocol ID: NA13L1B006

Trial ID: NA13L1B006

Location: Wiggins, MS

Study Director: Victor Maddox

Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox

Investigator: John Byrd

Trial Location

City: Wiggins

Trial Status: Completed

State/Prov.: MS

Directions:

Along west side of Highway 67 approximately 2 miles south of Highway 49 south of Wiggins, MS.

Conducted Under GLP: Conducted Under GEP: X

Objectives:

To reduce turfgrass height in order to potentially reduce mowing.

Crop Description

Crop 1: PASNO *Paspalum notatum*

Bahiagrass (Study set 1)

Site and Design

Plot Width, Unit: 10 FT

Site Type: _____

Plot Length, Unit: 20 FT

Tillage Type: _____

Replications: 3

Study Design: Randomized Complete Block

Application Description

	A	B
Application Date:	3/27/13	5/29/13
Time of Day:	8:00 am	1:00 PM
Application Method:	SPRAY	SPRAY
Application Timing:	PREPRE	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	V. Maddox	V. Maddox
Air Temperature, Unit:	41 F	86 F
% Relative Humidity:	30	60
Wind Velocity, Unit:	1 MPH	5 MPH
Wind Direction:	S	S
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	0	50

**MS Dot Standard Trials for Milestone and Opensight - Bahiagrass (Continued)
Analyses for Treatments 1-4**

Protocol ID: NA13L1B006
Location: Wiggins, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Application Equipment

	A	B
Appl. Equipment:	CO2 Backpack	CO2 Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Tank Mix (Y/N):	Y	Y

Reps: 3

Plots: 10 by 20 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.3035)

Trit No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Appl Code	Amt Product to Measure	Plot No. By Rep		
									1	2	3
1	HERB	Milestone	2	LBAE/GAL	SL	7 fl oz/a	A	4.375 ml/mx	101	203	309
	HERB	Accord XRT II	4	LB/GAL	SL	12.8 fl oz/a	A	8.0 ml/mx			
	ADJ	NIS	100 %		SL	0.25 % v/v	A	4.999 ml/mx			
2	HERB	Opensight	61.95	%AEW/W	WG	3.3 oz wt/a	A	1.977 g/mx	102	204	312
	HERB	Accord XRT II	4	LB/GAL	SL	12.8 fl oz/a	A	8.0 ml/mx			
	ADJ	NIS	100 %		SL	0.25 % v/v	A	4.999 ml/mx			
3	HERB	Oust	75	%AW/W	WG	0.5 oz wt/a	A	0.2996 g/mx	103	210	308
	HERB	Accord XRT II	4	LB/GAL	SL	12.8 fl oz/a	A	8.0 ml/mx			
	ADJ	NIS	100 %		SL	0.25 % v/v	A	4.999 ml/mx			
4	CHK	Untreated Check					A		104	202	311

**MS Dot Standard Trials for Milestone and Opensight - Bahiagrass (Continued)
Results and Conclusions: Application A (Treatments 1-4)**

Two applications were made in this study (see Page 1) and each application was analyzed separately. The first application included three herbicide treatments (See above). This discussion addresses this first application.

At 1 MAT no significant difference in overall cover was observed, but there was significantly less turf cover in Opensight or Oust treatments compared to Milestone or the untreated check. Bahiagrass (*Paspalum notatum*) height was not significant, but was shorter compared to the check, a trend through 2 MAT. There was no significant difference in weed control through 2 MAT. AT 2 MAT, there was no significant difference in overall or bahiagrass cover.

AT 3 MAT, Opensight had significantly higher bahiagrass damage (Chart 3). Bahiagrass height was significantly shorter in all treatments compared to the untreated check (Chart 2). Opensight also had lower overall cover at 3 MAT (Chart 3). There were no significant differences in goldenrod or vaseygrass control during this study. There was no significant difference in overall cover at 14 MAT, but bahiagrass cover was significantly lower in Opensight and Oust treatments. This illustrates possible long-term effects of herbicide applications.

The March application date reduced bahiagrass canopy height, but was probably too early. However, the second application date reduced both height and seedhead numbers in treated plots. This illustrates the significance of application timing for potentially reducing turfgrass mowing frequency.

Chart 1. Bahiagrass (*Paspalum notatum*) damage (control) in response to three herbicide treatments.

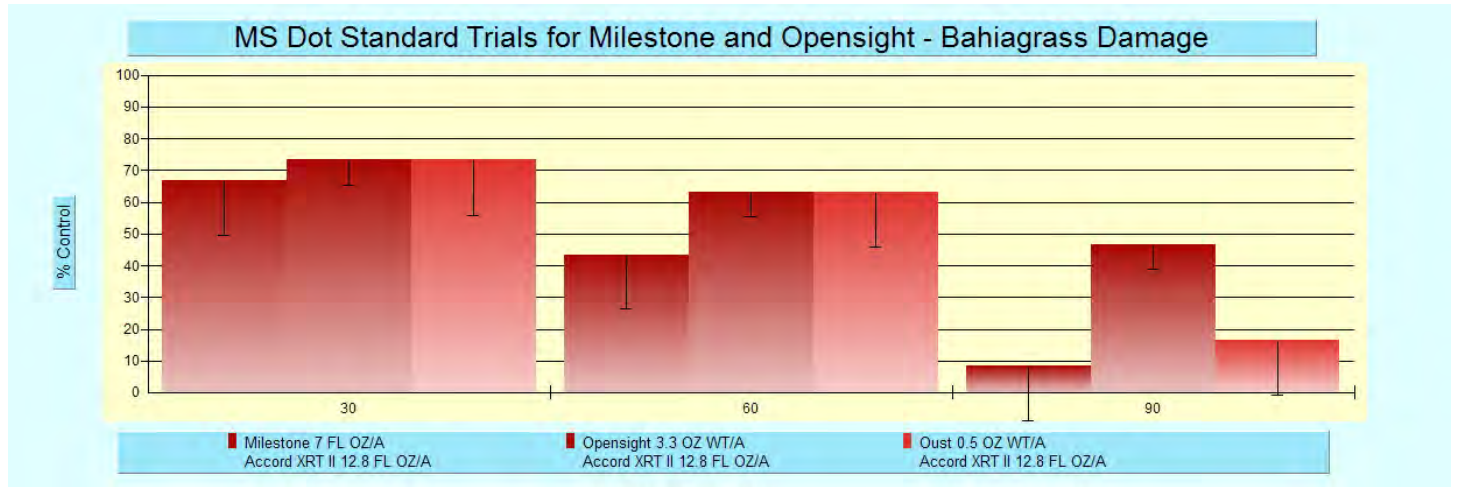
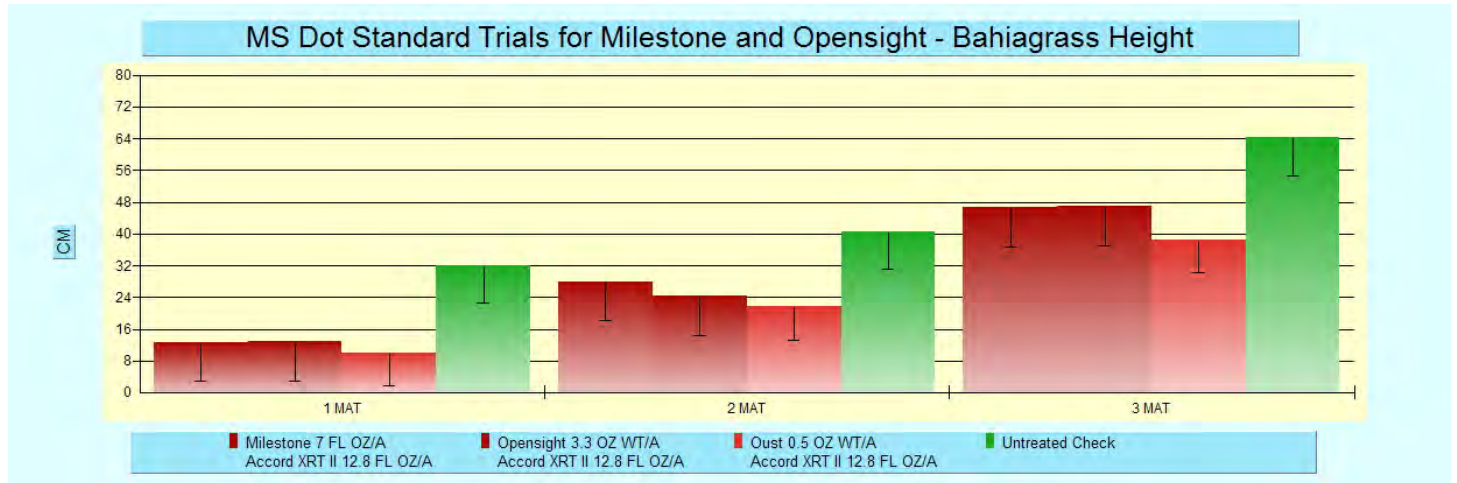


Chart 2. Bahiagrass (*Paspalum notatum*) height (cm) as influenced by three herbicide treatments.



MS Dot Standard Trials for Milestone and Opensight - Bahiagrass (Continued)
Analyses for Treatments 1-4

Protocol ID: NA13L1B006
 Location: Wiggins, MS

Trial ID: NA13L1B006
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Type			W Weed SOOCA Canadian go>				W Weed SOOCA Canadian go>	W Weed TRFCA Large hop c>	W Weed PASUR Vaseygrass		
Pest Code											
Pest Name											
Crop Code		PASNO		PASNO	FESAR						
BBCH Scale		BGRM		BGRM	BGRM						
Crop Name		Bahiagrass		Bahiagrass	Tall fescue	Overall cov>					
Rating Date		5/22/14	5/22/14	3/27/13	3/27/13	3/27/13	3/27/13	3/27/13	3/27/13		
Rating Data Type		GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit		%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Trt No.	Treatment Name	Rate	Unit	1	2	3	4	5	6	7	8
1	Milestone	7 fl oz/a		70.0 a	41.7 a	70.0	7.3	80.0	11.7	15.0	5.0
	Accord XRT II	12.8 fl oz/a									
	NIS	0.25 % v/v									
2	Opensight	3.3 oz wt/a		63.3 b	21.7 a	70.0	4.0	80.0	10.0	12.7	5.0
	Accord XRT II	12.8 fl oz/a									
	NIS	0.25 % v/v									
3	Oust	0.5 oz wt/a		60.0 b	46.7 a	70.0	9.0	80.0	11.7	16.7	5.0
	Accord XRT II	12.8 fl oz/a									
	NIS	0.25 % v/v									
4	Untreated Check			70.0 a	46.7 a	70.0	8.0	80.0	9.0	13.3	6.7
	LSD (P=Various)			5.77	23.07	0.00	5.44	0.00	4.91	8.27	2.88
	Standard Deviation			2.89	11.55	0.00	2.72	0.00	2.46	4.14	1.44
	CV			4.38	29.48	0.0	38.45	0.0	23.2	28.72	26.65
	Bartlett's X2			0.0	0.417	0.0	2.746	0.0	0.543	1.065	0.0
	P(Bartlett's X2)			.	0.937	.	0.432	.	0.762	0.785	.
	Mean Sep. Test			LSD.05	LSD.05						
	Replicate F			1.000	9.250	0.000	11.876	0.000	0.263	3.301	1.000
	Replicate Prob(F)			0.4219	0.0147	1.0000	0.0082	1.0000	0.7774	0.1079	0.4219
	Treatment F			9.000	3.188	0.000	1.899	0.000	0.862	0.562	1.000
	Treatment Prob(F)			0.0122	0.1056	1.0000	0.2309	1.0000	0.5102	0.6593	0.4547

Pest Type			W Weed VICAN Narrow-leav>				W Weed SOOCA Canadian go>	W Weed TRFCA Large hop c>	W Weed PASUR Vaseygrass		
Pest Code											
Pest Name											
Crop Code						PASNO					
BBCH Scale						BGRM					
Crop Name						BGRM	PASNO				
Rating Date						Bahiagrass	Bahiagrass				
Rating Data Type						4/26/13	4/26/13				
Rating Unit						CONTRO	HEIGHT				
Trt No.	Treatment Name	Rate	Unit	9	10	11	12	13	14	15	16
1	Milestone	7 fl oz/a		3.0	71.7 a	28.3 b	66.7 a	12.67 b	43.3 a	100.0 a	70.0 a
	Accord XRT II	12.8 fl oz/a									
	NIS	0.25 % v/v									
2	Opensight	3.3 oz wt/a		2.7	73.3 a	20.0 c	73.3 a	13.00 b	56.7 a	100.0 a	70.0 a
	Accord XRT II	12.8 fl oz/a									
	NIS	0.25 % v/v									
3	Oust	0.5 oz wt/a		3.3	73.3 a	18.3 c	73.3 a	10.00 b	50.0 a	100.0 a	73.3 a
	Accord XRT II	12.8 fl oz/a									
	NIS	0.25 % v/v									
4	Untreated Check			3.3	80.0 a	53.3 a	0.0 b	32.17 a	0.0 b	0.0 b	0.0 b
	LSD (P=Various)			4.38	9.85	5.77	11.04	3.753	18.84	0.00	5.77
	Standard Deviation			2.19	4.93	2.89	5.53	1.878	9.43	0.00	2.89
	CV			71.1	6.61	9.62	10.36	11.08	25.14	0.0	5.41
	Bartlett's X2			4.621	0.9	1.248	0.0	0.035	0.291	0.0	0.0
	P(Bartlett's X2)			0.099	0.638	0.536	0.001*	0.851	0.864	.	.
	Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F			0.121	4.200	3.000	0.273	1.157	4.500	0.000	1.000
	Replicate Prob(F)			0.8878	0.0723	0.1250	0.7703	0.3757	0.0640	1.0000	0.4219
	Treatment F			0.064	1.686	94.000	125.091	88.951	22.094	0.000	456.000
	Treatment Prob(F)			0.9772	0.2682	0.0001	0.0001	0.0001	0.0012	1.0000	0.0001

Means followed by same letter do not differ significantly.

**MS Dot Standard Trials for Milestone and Opensight - Bahiagrass (Continued)
Analyses for Treatments 1-4**

Protocol ID: NA13L1B006
Location: Wiggins, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Pest Type	Pest Code	Pest Name	Crop Code	BBCH Scale	Crop Name	Rating Date	Rating Data Type	Rating Unit	Overall turf	Overall turf	PASNO BGRM	PASNO BGRM	W Weed SOOCA Canadian go>	W Weed PASUR Vaseygrass	Overall turf	Overall turf	
						5/29/13	GROUND	%	5/29/13	5/29/13	Bahiagrass	Bahiagrass	5/29/13	5/29/13	6/26/13	6/26/13	
									%	%	CONTRO	HEIGHT	CONTRO	CONTRO	GROUND	GROUND	
											%	CM	%	%	%	%	
Trt No.	Treatment Name	Rate	Unit						17	18	19	20	21	22	23	24	
1	Milestone	7	fl oz/a	73.3	a	63.3	a	43.3	a	28.0	b	80.0	a	22.3	a	73.3	a
	Accord XRT II	12.8	fl oz/a														
	NIS	0.25	% v/v														
2	Opensight	3.3	oz wt/a	45.0	a	33.3	a	63.3	a	24.3	b	66.7	a	31.7	a	60.0	b
	Accord XRT II	12.8	fl oz/a														
	NIS	0.25	% v/v														
3	Oust	0.5	oz wt/a	43.3	a	33.3	a	63.3	a	21.7	b	66.7	a	50.0	a	76.7	a
	Accord XRT II	12.8	fl oz/a														
	NIS	0.25	% v/v														
4	Untreated Check			80.0	a	70.0	a	0.0	b	40.7	a	16.7	a	0.0	a	85.0	a
	LSD (P=Various)			36.97		30.93		23.07		6.36		73.18		37.23		11.89	
	Standard Deviation			18.50		15.48		11.55		3.18		36.63		18.63		5.95	
	CV			30.63		30.96		27.17		11.11		63.7		71.66		7.89	
	Bartlett's X2			5.583		3.448		4.074		5.907		2.089		0.686		0.301	
	P(Bartlett's X2)			0.061		0.328		0.13		0.116		0.554		0.709		0.583	
	Mean Sep. Test			LSD.05		LSD.05		LSD.05		LSD.05		LSD.05		LSD.05		LSD.05	
	Replicate F			0.554		0.548		0.750		1.044		1.174		3.121		0.059	
	Replicate Prob(F)			0.6016		0.6046		0.5120		0.4083		0.3713		0.1178		0.9434	
	Treatment F			3.154		4.730		20.063		20.932		1.745		3.738		9.941	
	Treatment Prob(F)			0.1075		0.0506		0.0016		0.0014		0.2570		0.0795		0.0096	

Pest Type	Pest Code	Pest Name	Crop Code	BBCH Scale	Crop Name	Rating Date	Rating Data Type	Rating Unit	Overall turf	Overall turf	PASNO BGRM	PASNO BGRM	W Weed SOOCA Canadian go>	W Weed PASUR Vaseygrass	Overall turf	Overall turf
						6/26/13	CONTRO	%	6/26/13	6/26/13	Bahiagrass	Bahiagrass	6/26/13	6/26/13	6/28/13	6/28/13
									%	%	HEIGHT	HEIGHT	CONTRO	CONTRO	GROUND	GROUND
											CM	CM	%	%	%	%
Trt No.	Treatment Name	Rate	Unit						25	26	27	28	29	30	31	32
1	Milestone	7	fl oz/a	8.3	bc	46.7	b	51.7	ab	43.3	a					
	Accord XRT II	12.8	fl oz/a													
	NIS	0.25	% v/v													
2	Opensight	3.3	oz wt/a	46.7	a	47.0	b	96.7	a	56.7	a					
	Accord XRT II	12.8	fl oz/a													
	NIS	0.25	% v/v													
3	Oust	0.5	oz wt/a	16.7	b	38.7	b	63.3	a	66.7	a					
	Accord XRT II	12.8	fl oz/a													
	NIS	0.25	% v/v													
4	Untreated Check			0.0	c	64.3	a	0.0	b	0.0	b					
	LSD (P=Various)			15.17		9.85		52.52		25.58						
	Standard Deviation			7.59		4.93		26.29		12.80						
	CV			42.37		10.03		49.67		30.72						
	Bartlett's X2			3.022		3.147		5.16		3.062						
	P(Bartlett's X2)			0.221		0.369		0.076		0.216						
	Mean Sep. Test			LSD.05		LSD.05		LSD.05		LSD.05						
	Replicate F			0.036		0.621		2.536		2.492						
	Replicate Prob(F)			0.9647		0.5689		0.1592		0.1630						
	Treatment F			21.530		14.450		6.982		15.797						
	Treatment Prob(F)			0.0013		0.0037		0.0220		0.0030						

Means followed by same letter do not differ significantly.

**MS Dot Standard Trials for Milestone and Oversight - Bahiagrass (Continued)
Analyses for Treatments 1-4**

Protocol ID: NA13L1B006
Location: Wiggins, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Chart 3. Overall plot cover as influenced by three herbicide treatments.

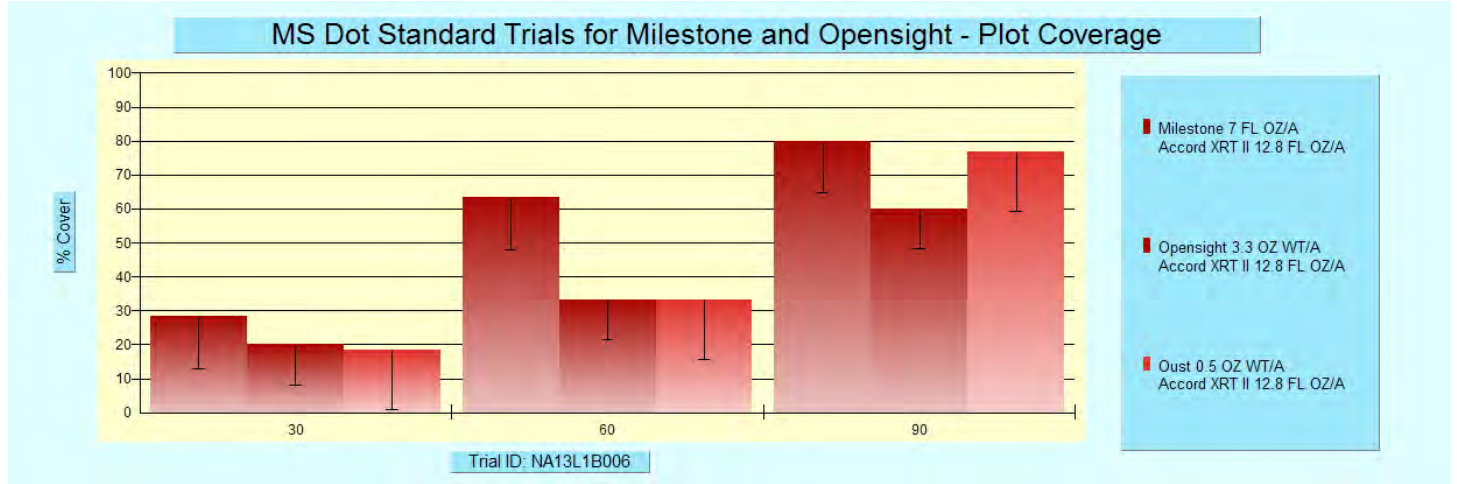


Chart 4. Canada goldenrod (*Solidago canadensis*) control.

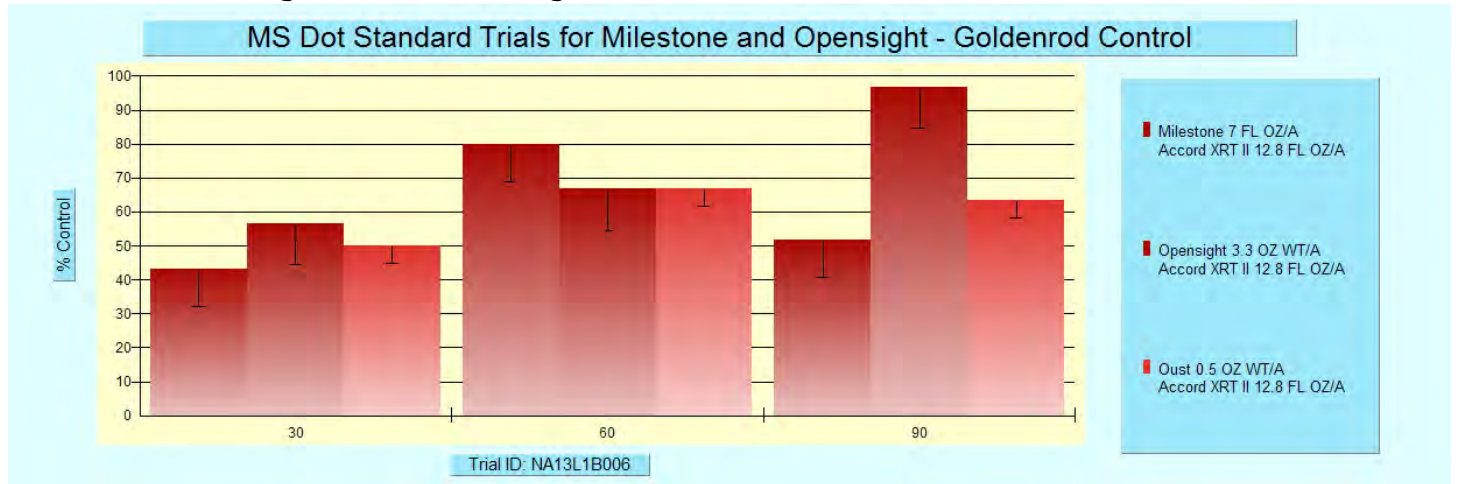
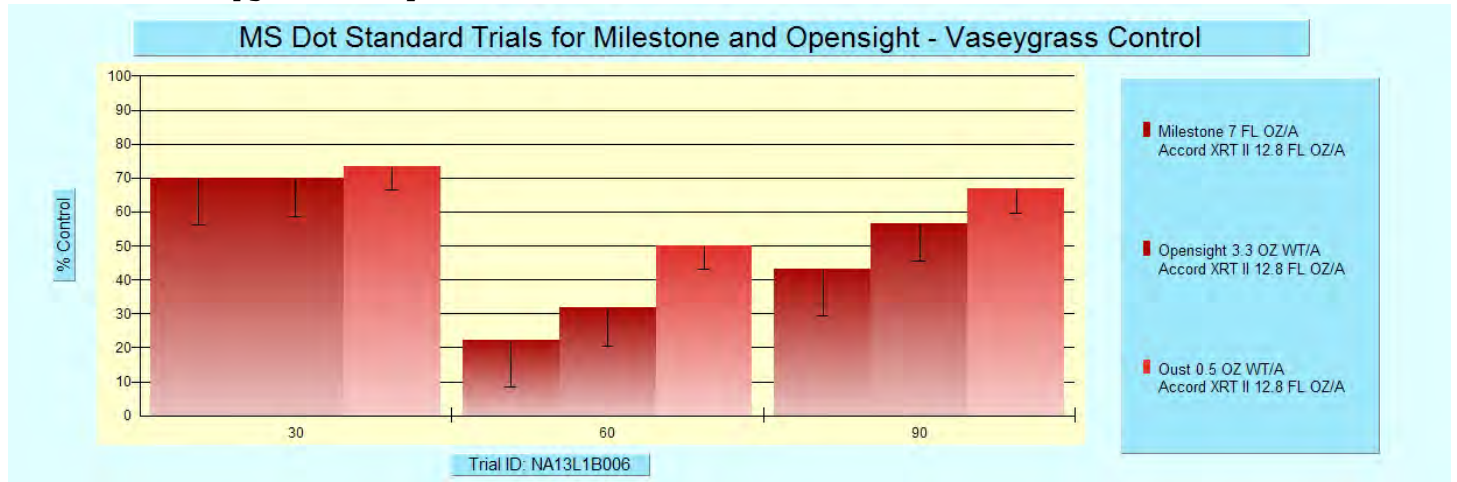


Chart 5. Vaseygrass (*Paspalum urvillei*) control.



**MS Dot Standard Trials for Milestone and Opensight - Bahiagrass (Continued)
Analyses for Treatments 5-12**

Protocol ID: NA13L1B006

Trial ID: NA13L1B006

Location: Wiggins, MS

Study Director: Victor Maddox

Investigator: John Byrd

Reps: 3

Plots: 10 by 20 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.3035)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
5	HERB	Milestone	2	LBAE/GAL	SL	3.5	fl oz/a	B	2.188 ml/mx	105	211	306
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
6	HERB	Milestone	2	LBAE/GAL	SL	5	fl oz/a	B	3.125 ml/mx	106	205	307
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
7	HERB	Milestone	2	LBAE/GAL	SL	7	fl oz/a	B	4.375 ml/mx	107	206	305
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
8	HERB	Opensight	61.95	%AEW/W	WG	2.5	oz wt/a	B	1.498 g/mx	108	207	301
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
9	HERB	Opensight	61.95	%AEW/W	WG	2.5	oz wt/a	B	1.498 g/mx	109	201	303
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
10	HERB	Opensight	61.95	%AEW/W	WG	3.3	oz wt/a	B	1.977 g/mx	110	212	302
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
11	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx	111	209	310
	HERB	MSMA	6	LBA/GAL	SC	2	lb ai/a	B	26.66 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
12	CHK	Untreated Check						B		112	208	304

Bahiagrass Results and Conclusions - Application B (Treatments 5-12)

Two applications on bahiagrass (*Paspalum notatum*) were made in this study (see Page 1) and each application was analyzed separately. The second application included seven herbicide treatments (See above). This discussion addresses this second application.

At 1 MAT, Plateau plus MSMA showed the greatest damage to bahiagrass (Chart 6). Overall (Chart 8) and bahiagrass cover were significantly higher in the untreated check and lowest in the Plateau plus MSMA treatment. Overall cover was lowest in Opensight alone and Plateau plus MSMA treatments, but not significantly lower than treatments 5, 9, or 10. Bahiagrass cover was lowest in Plateau plus MSMA, but not significantly lower than treatments 5, 8 or 9. Bahiagrass height (Chart 7) was shorter in all treatments compared to the untreated check and shortest in Plateau plus MSMA. Goldenrod (*Solidago canadensis*) and vaseygrass (*Paspalum urvillei*) control (Charts 9 and 10) were highest in Plateau plus MSMA at 80 and 70 percent, respectively.

At 2 MAT, overall and bahiagrass cover was lowest in treatments 8, 9, and 10. This was reflected in bahiagrass control (damage) which was highest in the same treatments. Bahiagrass height was also shorter in these treatments. No significant difference was observed in vaseygrass control, but goldenrod control was significantly higher in treatments 8, 9, 10, and 11.

At 12 MAT, treatment 6 and the check had the highest cover, but not significantly higher than treatments 5, 7, or 11. Goldenrod cover was lowest in treatment 9, but not significantly lower than treatments 8 or 10. It should be repeated that the March application date did reduce bahiagrass canopy height, but was probably too early. However, this second application date reduced both height and seedhead numbers in treated plots. This illustrates the significance of application timing for potentially reducing turfgrass mowing frequency.

**MS Dot Standard Trials for Milestone and Opensight - Bahiagrass (Continued)
Analyses for Treatments 5-12**

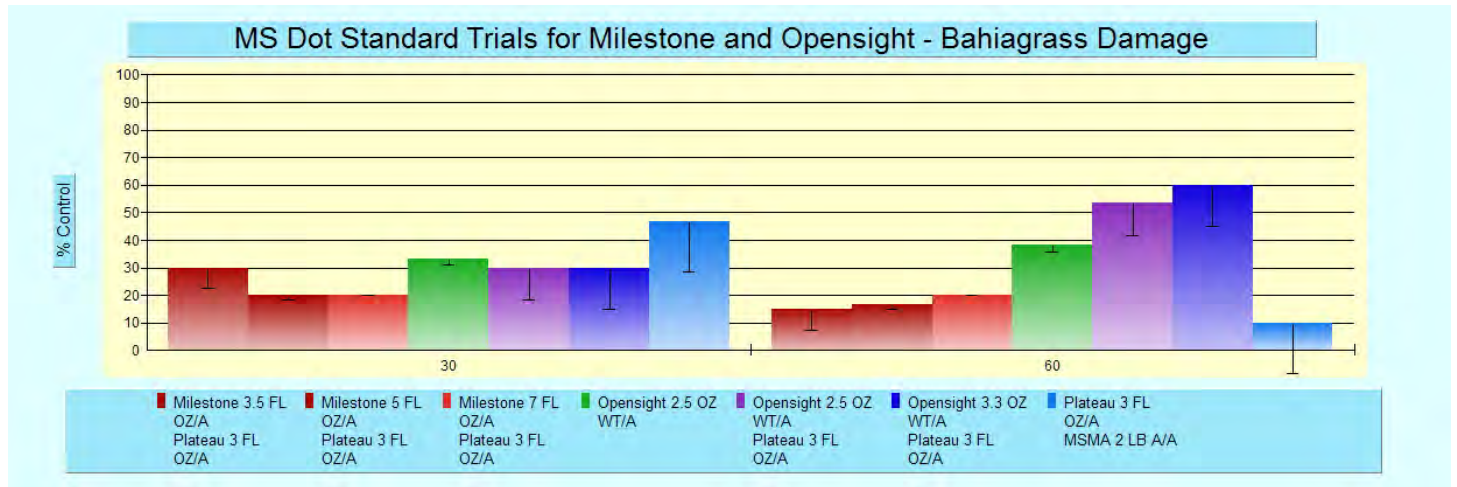
Protocol ID: NA13L1B006
Location: Wiggins, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		Canadian go>		Canadian go>	Large hop c>	Vaseygrass			
Crop Code	PASNO		PASNO	FESAR					
BBCH Scale	BGRM		BGRM	BGRM					
Crop Name	Bahiagrass		Bahiagrass	Tall fescue	Overall cov>				
Rating Date	5/22/14	5/22/14	3/27/13	3/27/13	3/27/13	3/27/13			
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA			
Trt Treatment	Rate								
No. Name	Rate Unit	1	2	3	4	5	6	7	8
5 Milestone	3.5 fl oz/a	66.7 a	43.3 ab	70.0	9.0	78.3	9.0	16.7	6.7
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
6 Milestone	5 fl oz/a	66.7 a	53.3 a	70.0	6.7	80.0	13.3	15.0	6.7
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
7 Milestone	7 fl oz/a	70.0 a	40.0 ab	70.0	7.3	78.3	11.7	18.3	6.7
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
8 Opensight	2.5 oz wt/a	63.3 a	28.3 bc	70.0	5.7	80.0	13.3	16.7	6.7
NIS	0.25 % v/v								
9 Opensight	2.5 oz wt/a	63.3 a	15.0 c	70.0	7.3	80.0	10.0	18.3	6.7
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
10 Opensight	3.3 oz wt/a	63.3 a	23.3 bc	70.0	8.3	80.0	13.3	16.7	5.0
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
11 Plateau	3 fl oz/a	66.7 a	46.7 ab	70.0	8.3	80.0	11.7	15.0	5.0
MSMA	2 lb ai/a								
NIS	0.25 % v/v								
12 Untreated Check		70.0 a	58.3 a	68.3	6.7	80.0	11.7	16.7	5.0
LSD (P=Various)		7.02	23.45	1.79	4.20	2.34	4.86	6.59	2.62
Standard Deviation		4.01	13.39	1.02	2.40	1.34	2.77	3.76	1.49
CV		6.05	34.74	1.46	32.3	1.68	23.61	22.56	24.73
Bartlett's X2		0.0	1.414	0.0	2.526	0.0	2.921	3.561	0.0
P(Bartlett's X2)		0.001*	0.985	.	0.925	1.00	0.819	0.829	1.00
Mean Sep. Test		LSD.05	LSD.05						
Replicate F		5.444	8.476	1.000	16.585	2.333	3.135	14.221	11.667
Replicate Prob(F)		0.0178	0.0039	0.3927	0.0002	0.1335	0.0750	0.0004	0.0010
Treatment F		1.444	3.803	1.000	0.627	1.000	1.012	0.337	1.000
Treatment Prob(F)		0.2639	0.0160	0.4706	0.7267	0.4706	0.4638	0.9236	0.4706

Means followed by same letter do not differ significantly.

Chart 6. Bahiagrass (*Paspalum notatum*) damage (control) in response to three herbicide treatments.



**MS Dot Standard Trials for Milestone and Opensight - Bahiagrass (Continued)
Analyses for Treatments 5-12**

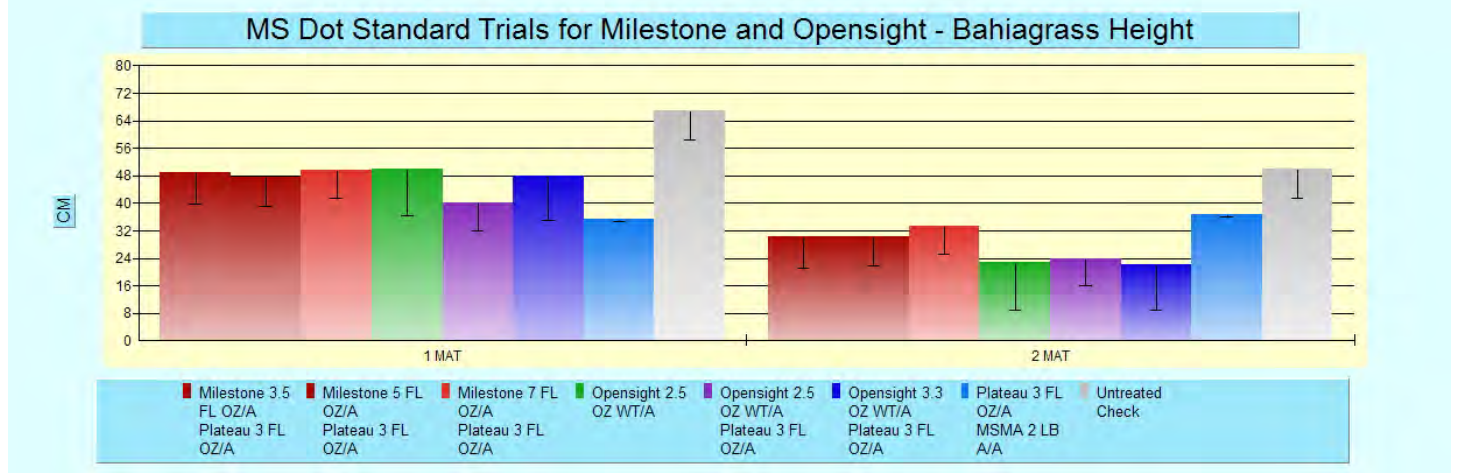
Protocol ID: NA13L1B006
Location: Wiggins, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name	Narrow-leav>				PASNO	PASNO	Canadian go>	Large hop c>	Vaseygrass	
Crop Code					BGRM	BGRM				
BBCH Scale					Bahiagrass	Bahiagrass				
Crop Name			Overall	Overall turf	4/26/13	4/26/13	4/26/13	4/26/13	4/26/13	
Rating Date	3/27/13	4/26/13	4/26/13	4/26/13	4/26/13	4/26/13	4/26/13	4/26/13	4/26/13	
Rating Data Type	GROUND	GROUND	GROUND	GROUND	CONTRO	HEIGHT	CONTRO	CONTRO	CONTRO	
Rating Unit	%AREA	%AREA	%	%	%	CM	%	%	%	
Trt No.	Treatment Name	Rate	9	10	11	12	13	14	15	16
5	Milestone Plateau NIS	3.5 fl oz/a 3 fl oz/a 0.25 % v/v	1.7							
6	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v	1.7							
7	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v	2.0							
8	Opensight Plateau NIS	2.5 oz wt/a 0.25 % v/v	2.0							
9	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v	2.0							
10	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v	2.0							
11	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v	3.3							
12	Untreated Check		2.0							
LSD (P=Various)		1.27	.	.	.	.	.	.	.	.
Standard Deviation		0.73	.	.	.	.	.	.	.	.
CV		34.94	.	.	.	.	.	.	.	.
Bartlett's X2		0.9	.	.	.	.	.	.	.	.
P(Bartlett's X2)		0.989	.	.	.	.	.	.	.	.
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		11.876								
Replicate Prob(F)		0.0010								
Treatment F		1.573								
Treatment Prob(F)		0.2227								

Means followed by same letter do not differ significantly.

Chart 7. Bahiagrass (*Paspalum notatum*) height (cm) as influenced by three herbicide treatments.



**MS Dot Standard Trials for Milestone and Opensight - Bahiagrass (Continued)
Analyses for Treatments 5-12**

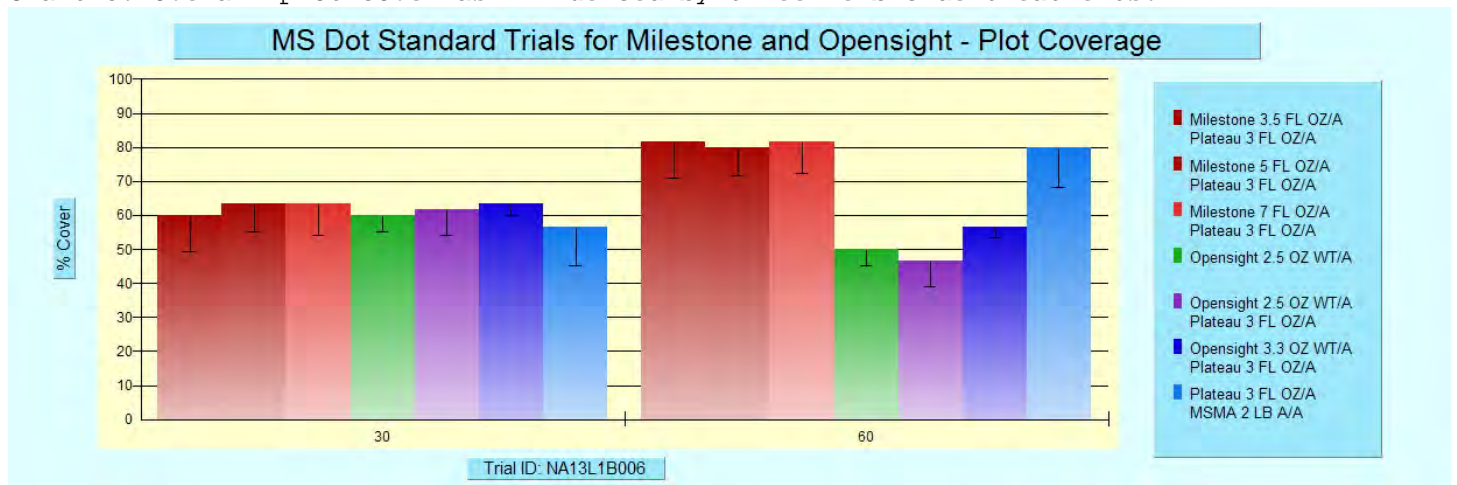
Protocol ID: NA13L1B006
Location: Wiggins, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		PASNO	PASNO	Canadian go>	Vaseygrass			PASNO	PASNO	
Crop Code		BGRM	BGRM					BGRM	BGRM	
BBCH Scale		Bahiagrass	Bahiagrass			Overall turf	Overall turf	Bahiagrass	Bahiagrass	
Crop Name		6/26/13	6/26/13	6/26/13	6/26/13	6/28/13	6/28/13	6/28/13	6/28/13	
Rating Date		CONTR0	HEIGHT	CONTR0	CONTR0	GROUND	GROUND	CONTR0	HEIGHT	
Rating Data Type		%	CM	%	%	%	%	%	CM	
Rating Unit										
Trt	Treatment	Rate								
No.	Name	Rate Unit	25	26	27	28	29	30	31	32
5	Milestone Plateau NIS	3.5 fl oz/a 3 fl oz/a 0.25 % v/v					73.3 bc	60.0 bc	30.0 b	49.0 b
6	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v					78.3 b	63.3 b	20.0 b	47.7 b
7	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v					76.7 b	63.3 b	20.0 b	49.7 b
8	Opensight NIS	2.5 oz wt/a 0.25 % v/v					70.0 c	60.0 bc	33.3 ab	50.0 b
9	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v					73.3 bc	61.7 bc	30.0 b	40.0 bc
10	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v					73.3 bc	63.3 b	30.0 b	48.0 b
11	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v					70.0 c	56.7 c	46.7 a	35.3 c
12	Untreated Check						85.0 a	75.0 a	0.0	67.0 a
	LSD (P=Various)		.	.	.	.	6.00	6.52	13.91	10.36
	Standard Deviation		.	.	.	.	3.43	3.72	7.82	5.91
	CV		.	.	.	.	4.57	5.91	26.06	12.24
	Bartlett's X2		.	.	.	.	0.371	3.133	3.118	2.422
	P(Bartlett's X2)		.	.	.	.	0.996	0.872	0.794	0.933
	Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F						11.430	30.333	11.455	0.948
	Replicate Prob(F)						0.0011	0.0001	0.0016	0.4109
	Treatment F						6.278	6.323	4.000	7.259
	Treatment Prob(F)						0.0018	0.0017	0.0197	0.0009

Means followed by same letter do not differ significantly.

Chart 8. Overall plot cover as influenced by three herbicide treatments.



MS Dot Standard Trials for Milestone and Opensight - Bahiagrass (Continued)
Analyses for Treatments 5-12

Protocol ID: NA13L1B006

Trial ID: NA13L1B006

Location: Wiggins, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Canadian go>	Vaseygrass			PASNO	PASNO	Canadian go>	Vaseygrass
Crop Code						BGRM	BGRM		
BBCH Scale				Overall turf	Overall turf	Bahiagrass	Bahiagrass		
Crop Name				7/29/13	7/29/13	7/29/13	7/29/13		
Rating Date		6/28/13	6/28/13	GROUND	GROUND	CONTRO	HEIGHT	7/29/13	7/29/13
Rating Data Type		CONTRO	CONTRO	%	%	%	CM	CONTRO	CONTRO
Rating Unit		%	%					%	%
Trt Treatment	Rate								
No. Name	Unit	33	34	35	36	37	38	39	40
5 Milestone	3.5 fl oz/a	16.7 e	43.3 c	71.7 a	81.7 a	15.0 b	30.3 bc	13.3 b	66.7 a
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
6 Milestone	5 fl oz/a	16.7 e	46.7 bc	66.7 a	80.0 a	16.7 b	30.3 bc	13.3 b	60.0 a
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
7 Milestone	7 fl oz/a	20.0 de	46.7 bc	68.3 a	81.7 a	20.0 b	33.3 b	13.3 b	76.7 a
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
8 Opensight	2.5 oz wt/a	56.7 b	6.7 d	45.0 b	50.0 b	38.3 ab	22.7 d	76.7 a	41.7 a
NIS	0.25 % v/v								
9 Opensight	2.5 oz wt/a	33.3 c	63.3 ab	40.0 b	46.7 b	53.3 a	24.0 cd	76.7 a	60.0 a
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
10 Opensight	3.3 oz wt/a	26.7 cd	53.3 abc	46.7 b	56.7 b	60.0 a	22.0 d	70.0 a	60.0 a
Plateau	3 fl oz/a								
NIS	0.25 % v/v								
11 Plateau	3 fl oz/a	80.0 a	70.0 a	71.7 a	80.0 a	10.0 b	36.7 b	66.7 a	86.7 a
MSMA	2 lb ai/a								
NIS	0.25 % v/v								
12 Untreated Check		0.0	0.0	80.0 a	88.3 a	0.0	50.0 a	0.0	0.0
LSD (P=Various)		9.38	17.79	15.97	17.99	29.49	6.88	11.97	25.75
Standard Deviation		5.27	10.00	9.12	10.27	16.58	3.93	6.73	14.47
CV		14.76	21.21	14.89	14.54	54.39	12.61	14.27	22.43
Bartlett's X2		2.499	2.327	11.951	12.585	7.363	4.345	3.886	8.051
P(Bartlett's X2)		0.777	0.887	0.063	0.028*	0.118	0.739	0.566	0.234
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		2.700	0.000	2.517	2.399	0.732	0.812	2.842	5.972
Replicate Prob(F)		0.1076	1.0000	0.1165	0.1271	0.5012	0.4638	0.0976	0.0158
Treatment F		62.286	12.381	8.122	7.829	4.394	16.610	67.158	2.926
Treatment Prob(F)		0.0001	0.0002	0.0005	0.0006	0.0141	0.0001	0.0001	0.0536

Means followed by same letter do not differ significantly.

**MS Dot Standard Trials for Milestone and Oversight - Bahiagrass (Continued)
Analyses for Treatments 5-12**

Protocol ID: NA13L1B006
Location: Wiggins, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Chart 9. Canada goldenrod (*Solidago canadensis*) control.

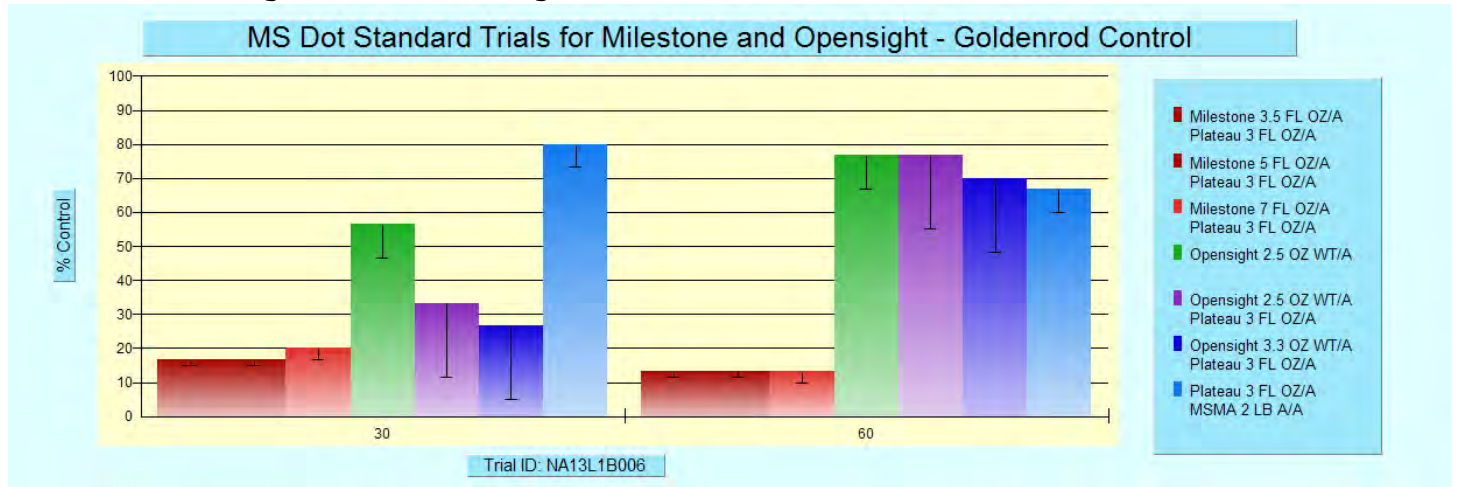
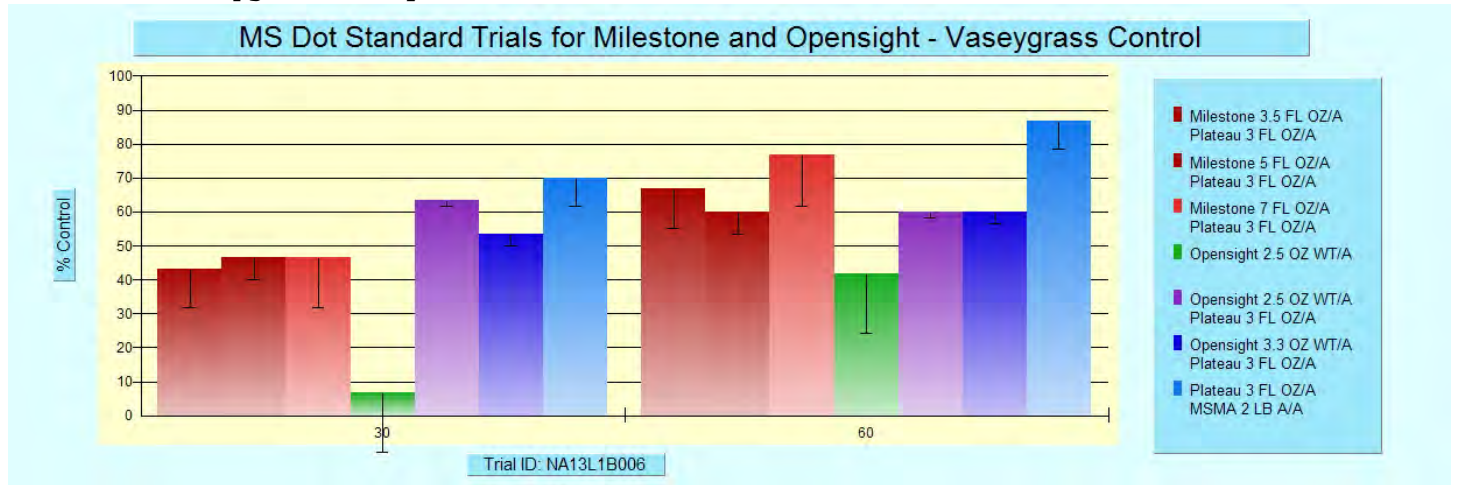


Chart 10. Vaseygrass (*Paspalum urvillei*) control.



**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass
Analyses for Treatments 1-4**

Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Title: _____
Title: _____

Trial Location

City: West Point
State/Prov.: MS

Trial Status: Complete
Trial Reliability: _____

Conducted Under GLP:
Conducted Under GEP: X

Official Trial Code: _____
Other Trial Code: _____

Crop Description

Crop 2: CYNDA *Cynodon dactylon* Bermudagrass (Study set 2)

Site and Design

Plot Width, Unit: 10 FT
Plot Length, Unit: 20 FT
Replications: 3

Site Type: _____
Tillage Type: _____
Study Design: Randomized Complete Block

Application Description

	A	B
Application Date:	3/28/13	5/30/13
Time of Day:	9:00 AM	9:00 AM
Application Method:	SPRAY	SPRAY
Application Timing:	PREPRE	PREPRE
Application Placement:	FOLIAR	FOLIAR
Applied By:	V. Maddox	V. Maddox
Air Temperature, Unit:	65 F	80 F
% Relative Humidity:	40	40
Wind Velocity, Unit:	2 MPH	4 MPH
Wind Direction:	S	S
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	10	80

Application Equipment

	A	B
Appl. Equipment:		
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	2003	2003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2	2
Tank Mix (Y/N):	Y	Y

**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass (Continued)
Analyses for Treatments 1-4**

Protocol ID: NA13L1B006

Trial ID: NA13L1B006

Location: West Point, MS

Study Director: Victor Maddox

Investigator: John Byrd

Reps: 3

Plots: 10 by 20 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.3035)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Milestone	2	LBAE/GAL	SL	7	fl oz/a	A	4.375 ml/mx	101	203	309
	HERB	Accord XRT II	4	LB/GAL	SL	12.8	fl oz/a	A	8.0 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	Opensight	61.95	%AEW/W	WG	3.3	oz wt/a	A	1.977 g/mx	102	204	312
	HERB	Accord XRT II	4	LB/GAL	SL	12.8	fl oz/a	A	8.0 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	HERB	Oust	75	%AW/W	WG	0.5	oz wt/a	A	0.2996 g/mx	103	210	308
	HERB	Accord XRT II	4	LB/GAL	SL	12.8	fl oz/a	A	8.0 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
4	CHK	Untreated Check						A		104	202	311

Bermudagrass Results and Conclusions: Application A (Treatments 1-4)

Two applications were made in this study (see Page 13) and each application was analyzed separately. The first application included three herbicide treatments (See above). This discussion addresses this first application.

Bermudagrass (*Cynodon dactylon*) control (damage) (Chart 11) and overall cover (Chart 12) were not significantly different at 1 MAT. It is likely that Accord XRT II was responsible for much of the damage, but no Accord XRT II stand-alone treatments were included. Still, damage (control) was minimal at 2 MAT and there were no significant differences between treatments. Oust plus Accord XRT II had the greatest effect upon bermudagrass height compared to other treatments, but was not significant at 3 MAT (Chart 13).

Tall fescue (*Schedonorus arundinaceus*) control (damage) was highest in the Oust plus Accord XRT II treatment (Chart 14), but not significantly higher than Opensight plus Accord XRT II at 1 MAT. As with bermudagrass, it is likely that Accord XRT II was responsible for much of the damage, but no Accord XRT II stand-alone treatments were included. Tall fescue height (Chart 15) was inversely proportional to damage. However, height was significantly reduced by treatments indicating that application timing and treatments were effective in height reduction. Oust was the most effective with heights on average under 60 cm (2 ft) compared to 120 cm (~4 ft) in untreated plots at 3 MAT.

Ryegrass (*Lolium multiflorum*) control was highest in the Oust treatment (Chart 16), but there were no significant differences in smooth brome control (*Bromus inermis*) (Chart 17), a trend observed through 2 MAT. Based upon the results of this study, it is possible that ryegrass at this location was susceptible to Oust. In addition, Milestone may have some activity on smooth brome, but results are inconclusive.

In conclusion, treatments had more influence upon tall fescue height than bermudagrass height. However, reductions in tall fescue height seem to parallel plant damage. Still, tall fescue average height can be reduced based upon the results of this study.

**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass (Continued)
Analyses for Treatments 1-4**

Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		CYNDABGRM	FESARBGRM	Italian rye>	Buckhorn pl>	Hairyfruit >	Curly dock	Carolina ge>	Bromus tect>
Crop Code		Bermuda gra>	Tall fescue						
BBCH Scale		3/27/13	3/27/13	3/27/13	3/27/13	3/27/13	3/27/13	3/27/13	3/27/13
Crop Name		GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Date		%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA
Rating Data Type									
Rating Unit									
Trt No.	Treatment Name	1	2	3	4	5	6	7	8
	Rate								
	Unit								
1	Milestone	60.0	40.0	10.0	3.3	8.3	0.3	1.0	10.0
	Accord XRT II								
	NIS								
	Rate								
	Unit								
2	Opensight	60.0	40.0	11.7	4.7	8.3	0.3	3.3	10.0
	Accord XRT II								
	NIS								
	Rate								
	Unit								
3	Oust	61.7	40.0	10.0	3.0	8.3	1.3	1.0	10.0
	Accord XRT II								
	NIS								
	Rate								
	Unit								
4	Untreated Check	66.7	30.0	10.0	4.0	10.0	1.0	1.0	11.7
LSD (P=Various)		6.00	9.99	2.88	4.53	4.99	2.64	4.04	2.88
Standard Deviation		3.00	5.00	1.44	2.27	2.50	1.32	2.02	1.44
CV		4.84	13.33	13.86	60.45	28.57	176.38	127.62	13.86
Bartlett's X2		0.342	0.639	0.0	1.069	0.0	4.777	0.0	0.639
P(Bartlett's X2)		0.952	0.887	.	0.784	0.001*	0.189	.	0.887
Mean Sep. Test									
Replicate F		106.846	37.000	1.000	2.384	1.000	1.000	1.000	37.000
Replicate Prob(F)		0.0001	0.0004	0.4219	0.1730	0.4219	0.4219	0.4219	0.0004
Treatment F		3.308	3.000	1.000	0.319	0.333	0.429	1.000	1.000
Treatment Prob(F)		0.0990	0.1170	0.4547	0.8119	0.8022	0.7400	0.4547	0.4547

Pest Name		Field madder		CYNDABGRM		FESARBGRM	Italian rye>	Bromus tect>
Crop Code				Bermuda gra>		Tall fescue		
BBCH Scale				4/29/13		4/29/13	4/29/13	4/29/13
Crop Name			Overall Cov>	CONTRO	Overall Cov>	CONTRO	CONTRO	CONTRO
Rating Date		3/27/13	3/27/13	%	%AREA	%	%	%
Rating Data Type		GROUND	GROUND		GROUND	CONTRO	CONTRO	CONTRO
Rating Unit		%AREA	%AREA					
Trt No.	Treatment Name	9	10	11	12	13	14	15
	Rate							
	Unit							
1	Milestone	3.7	95.0	31.7	91.7 a	13.3	23.3	60.0
	Accord XRT II							
	NIS							
	Rate							
	Unit							
2	Opensight	2.0	95.0	41.7 a	93.3 a	28.3 a	46.7 ab	30.0 ab
	Accord XRT II							
	NIS							
	Rate							
	Unit							
3	Oust	1.7	95.0	36.7 a	90.0 a	43.3 a	93.3 a	71.7 a
	Accord XRT II							
	NIS							
	Rate							
	Unit							
4	Untreated Check	3.3	95.0	0.0 b	95.0 a	0.0 b	0.0 b	0.0 b
LSD (P=Various)		2.21	0.00	29.87	3.72	17.72	48.96	51.66
Standard Deviation		1.11	0.00	13.18	1.86	7.82	21.60	22.79
CV		41.46	0.0	50.46	2.01	32.72	46.29	67.25
Bartlett's X2		1.446	0.0	0.073	0.0	1.023	1.927	0.113
P(Bartlett's X2)		0.695	.	0.787	1.00	0.312	0.165	0.736
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		11.727	0.000	3.856	1.800	1.136	0.929	0.037
Replicate Prob(F)		0.0085	1.0000	0.1166	0.2441	0.4066	0.4664	0.9636
Treatment F		2.364	0.000	8.944	4.000	23.773	14.000	7.481
Treatment Prob(F)		0.1702	1.0000	0.0334	0.0701	0.0060	0.0156	0.0445

Means followed by same letter do not significantly differ.

**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass (Continued)
Analyses for Treatments 1-4**

Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		CYNDA	FESAR	Italian rye>	Bromus tect>		CYNDA	FESAR	
Crop Code		BGRM	BGRM			Overall Cov>	Bermuda gra>	BGRM	
BBCH Scale		Bermuda gra>	Tall fescue			Bermuda gra>	Tall fescue	BGRM	
Crop Name		5/28/13	5/28/13	5/28/13	5/28/13	5/28/13	5/28/13	5/28/13	
Rating Date		CONTRO	CONTRO	CONTRO	CONTRO	GROUND	HEIGHT	HEIGHT	
Rating Data Type		%	%	%	%	%AREA	CM	CM	
Rating Unit									
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate	Rate	Rate	
		Unit	Unit	Unit	Unit	Unit	Unit	Unit	
1	Milestone	7 fl oz/a	0.0	0.0	50.0	35.0	95.0 a	36.3 b	80.3 b
	Accord XRT II	12.8 fl oz/a							
	NIS	0.25 % v/v							
2	Opensight	3.3 oz wt/a	1.7 a	0.0 a	28.3 b	5.0 a	95.0 a	36.7 b	62.0 bc
	Accord XRT II	12.8 fl oz/a							
	NIS	0.25 % v/v							
3	Oust	0.5 oz wt/a	11.7 a	0.0 a	93.3 a	32.0 a	91.7 a	30.0 c	50.0 c
	Accord XRT II	12.8 fl oz/a							
	NIS	0.25 % v/v							
4	Untreated Check		0.0 a	0.0 a	0.0 c	20.0 a	95.0 a	43.3 a	130.0 a
	LSD (P=Various)		11.01	0.00	24.77	68.18	2.88	3.03	22.98
	Standard Deviation		4.86	0.00	10.93	30.08	1.44	1.52	11.50
	CV		109.33	0.0	26.95	158.32	1.53	4.15	14.27
	Bartlett's X2		1.526	0.0	0.55	6.126	0.0	0.345	0.693
	P(Bartlett's X2)		0.217	.	0.458	0.047*	.	0.951	0.707
	Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F		0.824	0.000	2.535	0.316	1.000	26.494	2.364
	Replicate Prob(F)		0.5017	1.0000	0.1945	0.7454	0.4219	0.0011	0.1750
	Treatment F		5.059	0.000	57.512	0.607	4.000	38.590	28.149
	Treatment Prob(F)		0.0803	1.0000	0.0011	0.5887	0.0701	0.0003	0.0006

Pest Name		CYNDA	FESAR		CYNDA	FESAR	Buckhorn pl>	FESAR
Crop Code		BGRM	BGRM	Overall Cov>	BGRM	BGRM		BGRM
BBCH Scale		Bermuda gra>	Tall fescue	Bermuda gra>	Tall fescue	Tall fescue		Tall fescue
Crop Name		6/25/13	6/25/13	6/25/13	6/25/13	6/25/13	6/28/13	6/28/13
Rating Date		GROUND	GROUND	GROUND	HEIGHT	HEIGHT	CONTRO	CONTRO
Rating Data Type		%AREA	%AREA	%AREA	CM	CM	%	%
Rating Unit								
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate	Rate	Rate
		Unit	Unit	Unit	Unit	Unit	Unit	Unit
1	Milestone	7 fl oz/a	60.0 a	33.3 a	100.0 a	45.7 a	102.3 b	
	Accord XRT II	12.8 fl oz/a						
	NIS	0.25 % v/v						
2	Opensight	3.3 oz wt/a	63.3 a	30.0 a	100.0 a	51.3 a	70.0 c	
	Accord XRT II	12.8 fl oz/a						
	NIS	0.25 % v/v						
3	Oust	0.5 oz wt/a	70.0 a	20.0 a	100.0 a	45.7 a	58.0 c	
	Accord XRT II	12.8 fl oz/a						
	NIS	0.25 % v/v						
4	Untreated Check		73.3 a	21.7 a	100.0 a	55.3 a	121.3 a	
	LSD (P=Various)		16.65	20.32	0.00	10.19	17.52	.
	Standard Deviation		8.33	10.17	0.00	5.10	8.77	.
	CV		12.5	38.75	0.0	10.31	9.97	.
	Bartlett's X2		1.059	3.48	0.0	4.072	4.052	.
	P(Bartlett's X2)		0.787	0.323	.	0.254	0.256	.
	Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F		32.520	11.416	0.000	0.202	4.698	
	Replicate Prob(F)		0.0006	0.0090	1.0000	0.8227	0.0592	
	Treatment F		1.600	1.201	0.000	2.566	33.053	
	Treatment Prob(F)		0.2853	0.3865	1.0000	0.1504	0.0004	

Means followed by same letter do not significantly differ.

**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass (Continued)
Analyses for Treatments 1-4**

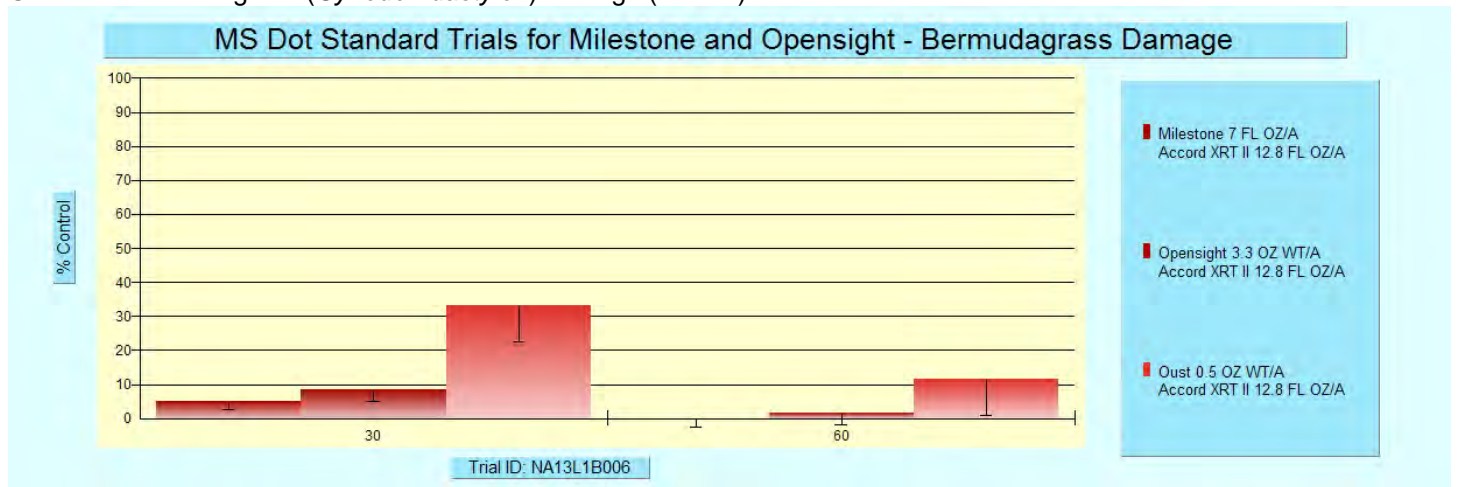
Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		FESAR		CYNDA	FESAR	FESAR
Crop Code		BGRM		BGRM	BGRM	BGRM
BBCH Scale		Tall fescue	Overall Cov>	Bermuda gra>	Tall fescue	Tall fescue
Crop Name		7/29/13	8/28/13	8/28/13	8/28/13	5/13/14
Rating Date		HEIGHT	GROUND	HEIGHT	HEIGHT	GROUND
Rating Data Type		CM	%AREA	CM	CM	%AREA
Rating Unit						
Trt	Treatment					
No.	Name	Rate	Unit	37	38	39
1	Milestone	7 fl oz/a				41.7 a
	Accord XRT II	12.8 fl oz/a				
	NIS	0.25 % v/v				
2	Opensight	3.3 oz wt/a				30.0 a
	Accord XRT II	12.8 fl oz/a				
	NIS	0.25 % v/v				
3	Oust	0.5 oz wt/a				25.0 a
	Accord XRT II	12.8 fl oz/a				
	NIS	0.25 % v/v				
4	Untreated Check					13.3 a
LSD (P=Various)		.	.	.	.	26.06
Standard Deviation		.	.	.	.	13.04
CV		.	.	.	.	47.43
Bartlett's X2		.	.	.	.	1.227
P(Bartlett's X2)		.	.	.	.	0.746
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F						8.412
Replicate Prob(F)						0.0182
Treatment F						2.433
Treatment Prob(F)						0.1631

Means followed by same letter do not significantly differ.

Chart 11. Bermudagrass (*Cynodon dactylon*) damage (control) at 1 and 2 MAT.



**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass (Continued)
Analyses for Treatments 1-4**

Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Chart 12. Overall treatment cover through 3 MAT.

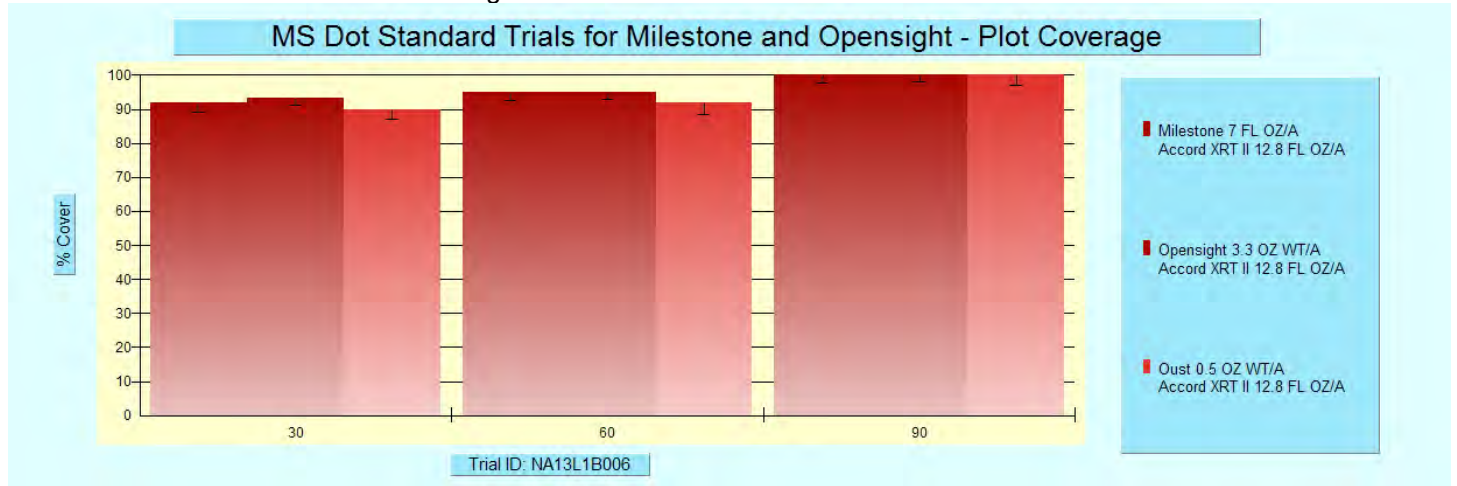


Chart 13. Bermudagrass (*Cynodon dactylon*) height (cm) through 3 MAT.

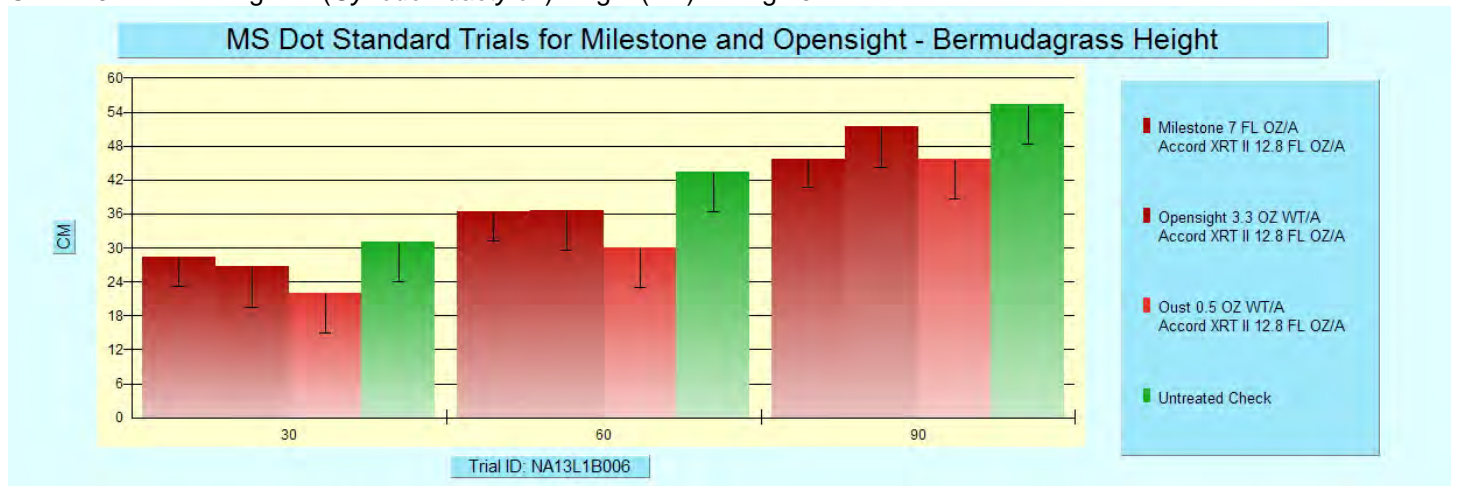
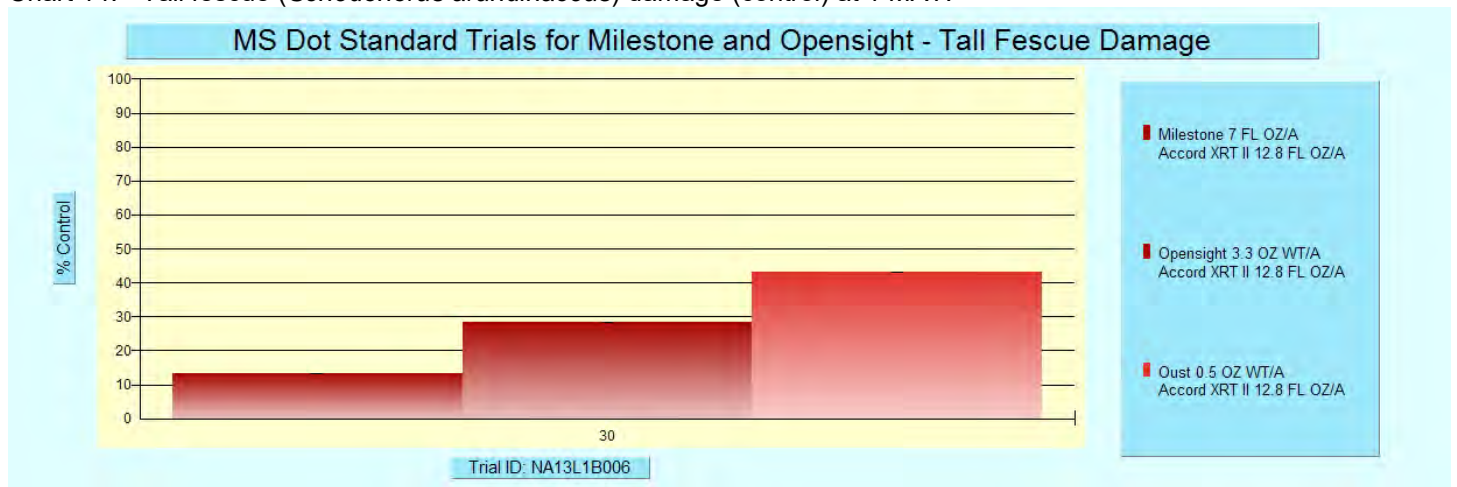


Chart 14. Tall fescue (*Schedonorus arundinaceus*) damage (control) at 1 MAT.



**MS Dot Standard Trials for Milestone and Oversight - Bermudagrass (Continued)
Analyses for Treatments 1-4**

Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Chart 15. Tall fescue (*Schedonorus arundinaceus*) height (cm) as influenced by three herbicide treatments.

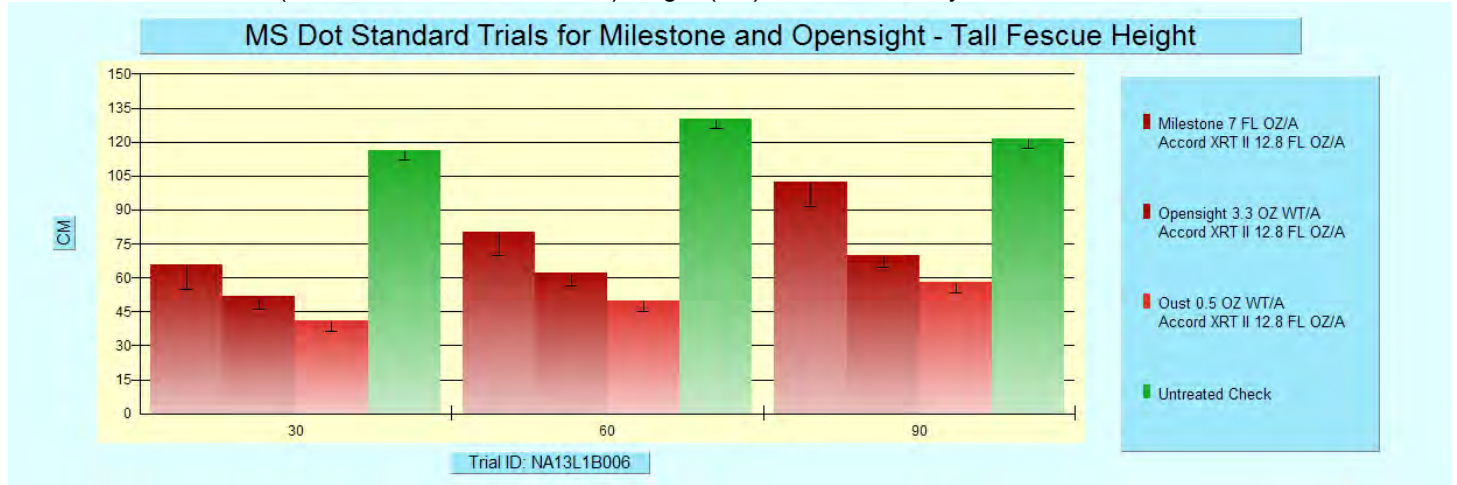


Chart 16. Annual ryegrass (*Lolium multiflorum*) control through 2 MAT.

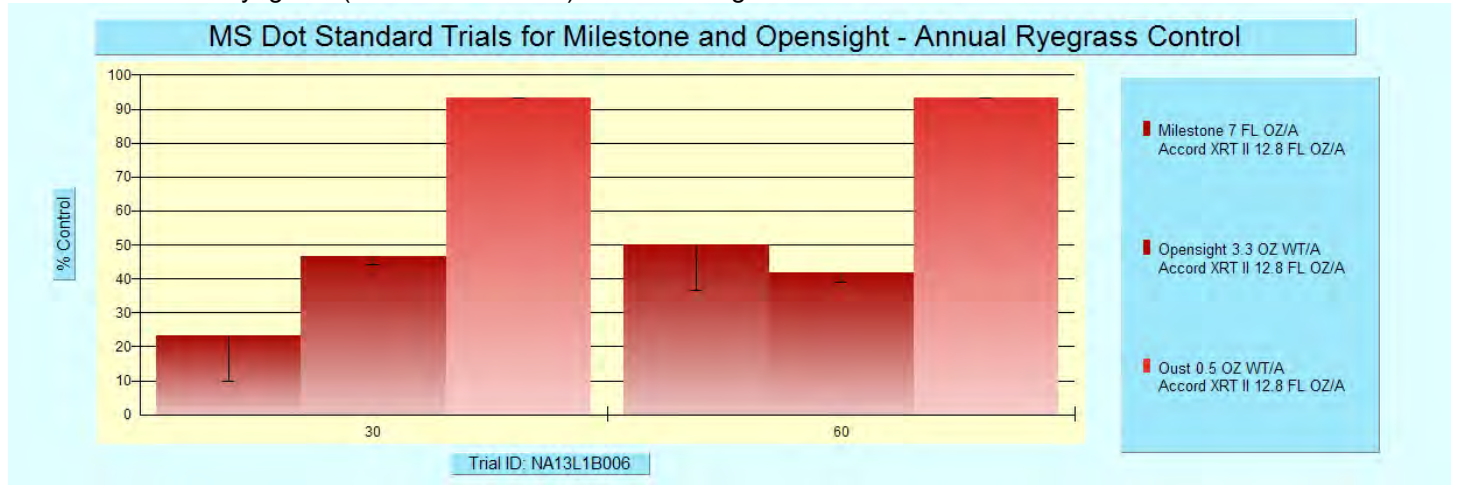
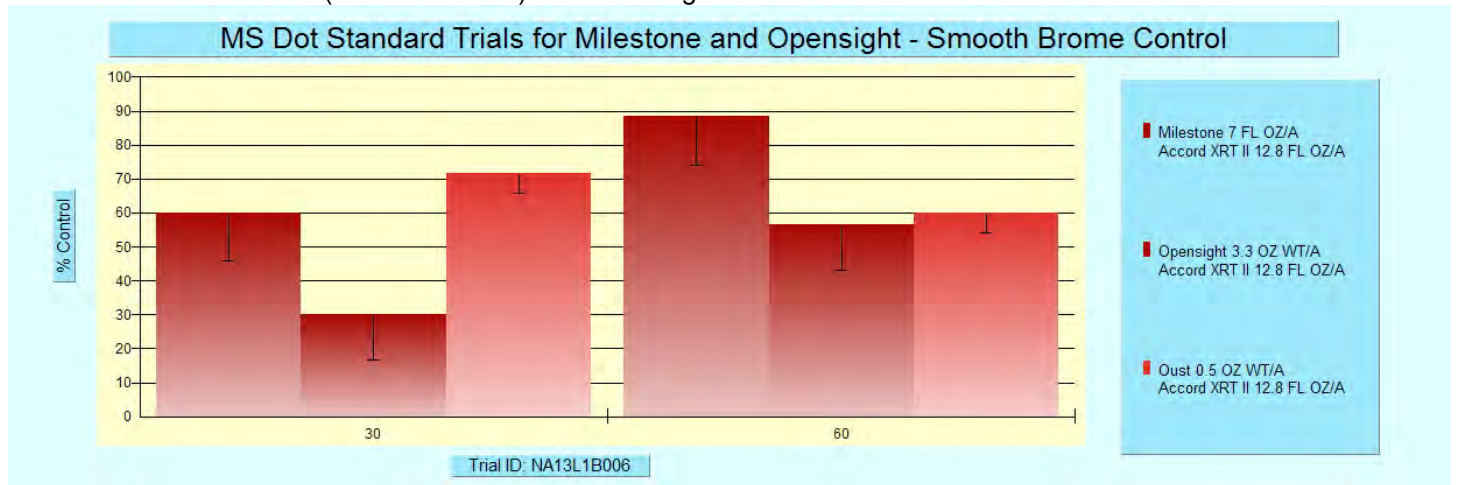


Chart 17. Smooth brome (*Bromus inermis*) control through 2 MAT.



**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass
Analyses for Treatments 5-12**

Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Reps: 3

Plots: 10 by 20 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.3035)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
5	HERB	Milestone	2	LBAE/GAL	SL	3.5	fl oz/a	B	2.188 ml/mx	105	211	306
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
6	HERB	Milestone	2	LBAE/GAL	SL	5	fl oz/a	B	3.125 ml/mx	106	205	307
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
7	HERB	Milestone	2	LBAE/GAL	SL	7	fl oz/a	B	4.375 ml/mx	107	206	305
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
8	HERB	Opensight	61.95	%AEW/W	WG	2.5	oz wt/a	B	1.498 g/mx	108	207	301
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
9	HERB	Opensight	61.95	%AEW/W	WG	2.5	oz wt/a	B	1.498 g/mx	109	201	303
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
10	HERB	Opensight	61.95	%AEW/W	WG	3.3	oz wt/a	B	1.977 g/mx	110	212	302
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
11	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx	111	209	310
	HERB	MSMA	6	LBA/GAL	SC	2	lb ai/a	B	26.66 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
12	CHK	Untreated Check						A		112	208	304

Bermudagrass Results and Conclusions - Application B (Treatments 5-12)

Two applications on bermudagrass (*Cynodon dactylon*) were made in this study (see Page 20) and each application was analyzed separately. The second application included seven herbicide treatments (See above). This discussion addresses this second application on bermudagrass.

At 1 MAT, there were no significant differences in control (damage) on bermudagrass (Chart 18) or tall fescue (*Schedonorus arundinaceus*) (Chart 19). However, there was a significant reduction in height for both species compared to the untreated check (Charts 20 and 21), but not between herbicide treatments. Buckhorn plantain (*Plantago lanceolata*) control ranged from 85 percent (treatments 9 and 10) to 41.7 percent (treatment 6).

By 2 MAT, no control (damage) on bermudagrass or tall fescue was observed. No significant differences in bermudagrass or tall fescue height were observed at 2 and 3 MAT. Buckhorn plantain control ranged from 93.3 percent (treatments 9 and 10) to 46.7 (treatment 6) at 2 MAT.

This study indicates that the treatment effects of these herbicide treatments on bermudagrass and tall fescue may be relatively short. However, tall fescue ground cover at approximately 1 YAT indicates reduced cover from herbicide treatments (5 to 15 percent) compared to the untreated check (36.7 percent). Although this pattern was not significant, it does indicate possible long-term effects upon tall fescue cover. Some treatments also had acceptable control on buckhorn plantain, particularly Opensight plus Plateau combinations and to a lesser degree Plateau plus MSMA.

**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass
Analyses for Treatments 5-12**

Protocol ID: NA13L1B006

Trial ID: NA13L1B006

Location: West Point, MS

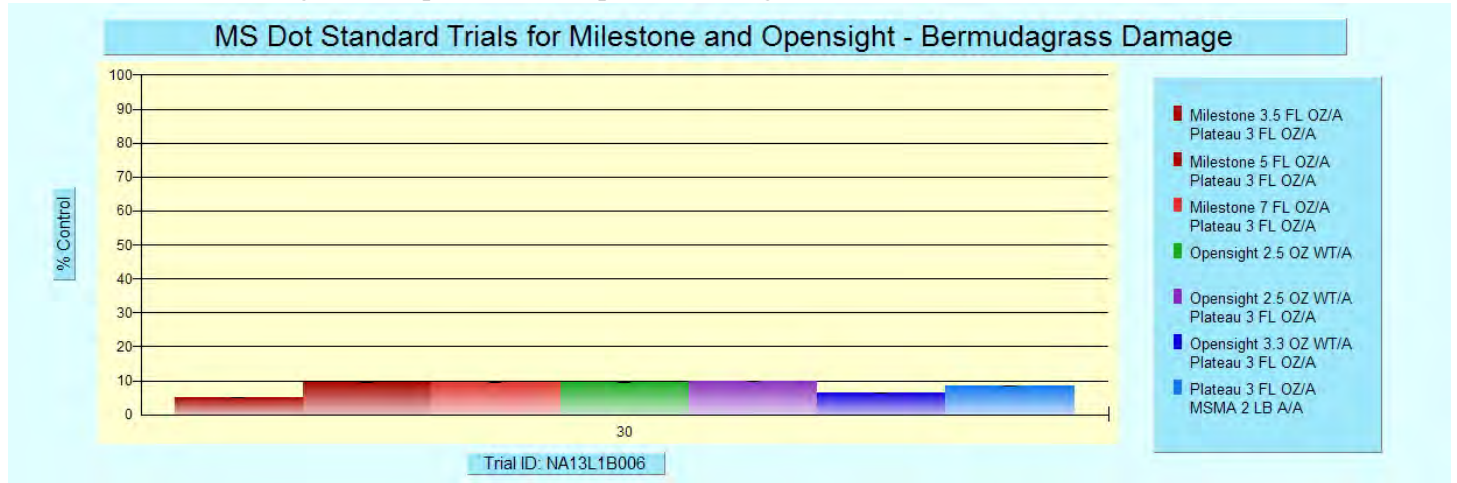
Study Director: Victor Maddox

Investigator: John Byrd

Pest Name			Italian rye>	Buckhorn pl>	Hairyfruit >	Curly dock	Carolina ge>	Bromus tect>		
Crop Code		CYNDA								
BBCH Scale		BGRM								
Crop Name		Bermuda gra>	Tall fescue							
Rating Date		3/27/13	3/27/13	3/27/13	3/27/13	3/27/13	3/27/13	3/27/13		
Rating Data Type		GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit		%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Trt No.	Treatment Name	Rate	1	2	3	4	5	6	7	8
5	Milestone Plateau NIS	3.5 fl oz/a 3 fl oz/a 0.25 % v/v	63.3	36.7	10.0	6.0	10.0	0.0	1.0	6.7
6	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v	63.3	36.7	10.0	6.7	10.0	0.3	1.0	10.0
7	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v	53.3	46.7	10.0	5.0	11.7	0.3	1.0	10.0
8	Opensight NIS	2.5 oz wt/a 0.25 % v/v	56.7	40.0	10.0	5.0	11.7	0.3	1.0	8.3
9	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v	56.7	40.0	10.0	5.0	8.3	1.0	1.0	10.0
10	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v	53.3	46.7	10.0	6.0	10.0	0.7	1.0	10.0
11	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v	60.0	40.0	10.0	6.0	9.0	0.0	2.3	10.0
12	Untreated Check		53.3	46.7	10.0	5.0	9.0	0.3	1.0	8.3
LSD (P=Various)			13.17	14.62	0.00	2.27	4.84	0.82	0.72	3.82
Standard Deviation			7.52	8.35	0.00	1.30	2.76	0.47	0.41	2.18
CV			13.08	20.03	0.0	23.25	27.75	125.15	34.99	23.81
Bartlett's X2			6.786	5.307	0.0	1.261	2.897	1.119	0.0	0.971
P(Bartlett's X2)			0.451	0.623	.	0.868	0.716	0.952	.	0.808
Mean Sep. Test										
Replicate F			5.968	5.444	0.000	8.633	0.333	5.108	1.000	3.500
Replicate Prob(F)			0.0133	0.0178	1.0000	0.0036	0.7224	0.0216	0.3927	0.0585
Treatment F			0.968	0.821	0.000	0.777	0.579	1.486	4.000	1.000
Treatment Prob(F)			0.4896	0.5862	1.0000	0.6164	0.7620	0.2496	0.0131	0.4706

Means followed by same letter do not differ significantly.

Chart 18. Bermudagrass (*Cynodon dactylon*) damage (control) at 1 MAT.



**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass
Analyses for Treatments 5-12**

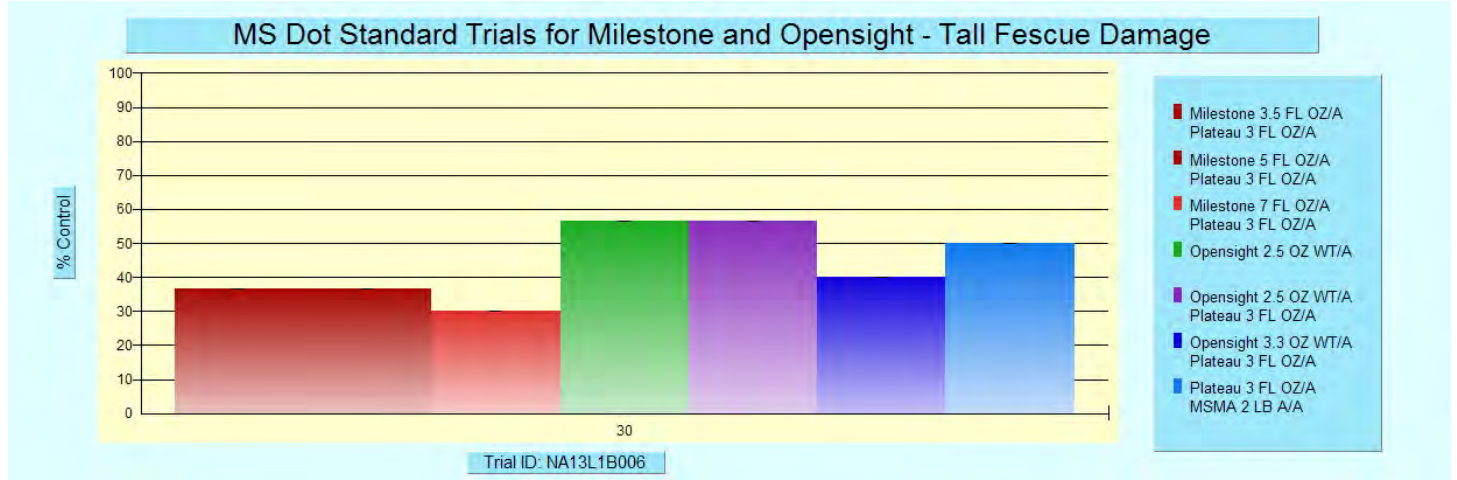
Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name	Field madder		CYNDA BGRM		FESAR BGRM	Italian rye>	Bromus tect>
Crop Code		Overall Cov>	Bermuda gra>	Overall Cov>	Tall fescue		
BBCH Scale		3/27/13	4/29/13	4/29/13	4/29/13	4/29/13	4/29/13
Crop Name		GROUND	CONTRO	GROUND	CONTRO	CONTRO	CONTRO
Rating Date	3/27/13	%AREA	%	%AREA	%	%	%
Rating Data Type	GROUND	%AREA		%AREA			
Rating Unit	%AREA						
Trt Treatment	Rate						
No. Name	Rate Unit	9	10	11	12	13	14
5 Milestone	3.5 fl oz/a	4.0	95.0				
Plateau	3 fl oz/a						
NIS	0.25 % v/v						
6 Milestone	5 fl oz/a	4.7	95.0				
Plateau	3 fl oz/a						
NIS	0.25 % v/v						
7 Milestone	7 fl oz/a	3.7	95.0				
Plateau	3 fl oz/a						
NIS	0.25 % v/v						
8 Opensight	2.5 oz wt/a	4.3	95.0				
NIS	0.25 % v/v						
9 Opensight	2.5 oz wt/a	3.0	95.0				
Plateau	3 fl oz/a						
NIS	0.25 % v/v						
10 Opensight	3.3 oz wt/a	4.0	95.0				
Plateau	3 fl oz/a						
NIS	0.25 % v/v						
11 Plateau	3 fl oz/a	3.7	95.0				
MSMA	2 lb ai/a						
NIS	0.25 % v/v						
12 Untreated Check		3.7	95.0				
LSD (P=Various)		4.25	0.00	.	.	.	.
Standard Deviation		2.43	0.00	.	.	.	.
CV		62.68	0.0	.	.	.	.
Bartlett's X2		3.707	0.0	.	.	.	.
P(Bartlett's X2)		0.813	.	.	.	.	.
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		3.624	0.000				
Replicate Prob(F)		0.0539	1.0000				
Treatment F		0.128	0.000				
Treatment Prob(F)		0.9946	1.0000				

Means followed by same letter do not differ significantly.

Chart 19. Tall fescue (*Schedonorus arundinaceus*) damage (control) at 1 MAT.



**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass
Analyses for Treatments 5-12**

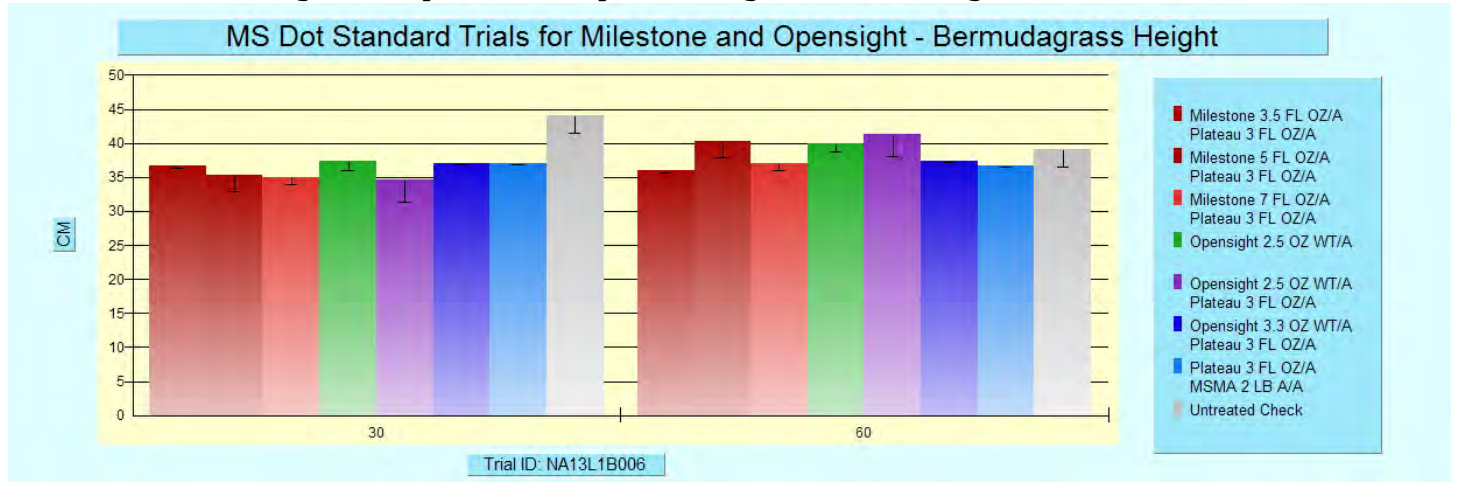
Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Crop Code BBCH Scale Crop Name Rating Date Rating Data Type Rating Unit	CYNDA BGRM Bermuda gra> 6/25/13 GROUND %AREA	FESAR BGRM Tall fescue 6/25/13 GROUND %AREA	Overall Cov> 6/25/13 GROUND %AREA	CYNDA BGRM Bermuda gra> 6/25/13 HEIGHT CM	FESAR BGRM Tall fescue 6/25/13 HEIGHT CM	Buckhorn pl>	FESAR BGRM Tall fescue 6/28/13 CONTRO %
						28	29
Trt Treatment	23	24	25	26	27	28	29
5 Milestone Plateau NIS 3.5 fl oz/a 3 fl oz/a 0.25 % v/v						45.0 b	36.7 ab
6 Milestone Plateau NIS 5 fl oz/a 3 fl oz/a 0.25 % v/v						41.7 b	36.7 ab
7 Milestone Plateau NIS 7 fl oz/a 3 fl oz/a 0.25 % v/v						58.3 ab	30.0 b
8 Opensight NIS 2.5 oz wt/a 0.25 % v/v						66.7 ab	56.7 a
9 Opensight Plateau NIS 2.5 oz wt/a 3 fl oz/a 0.25 % v/v						85.0 a	56.7 a
10 Opensight Plateau NIS 3.3 oz wt/a 3 fl oz/a 0.25 % v/v						85.0 a	40.0 ab
11 Plateau MSMA NIS 3 fl oz/a 2 lb ai/a 0.25 % v/v						78.3 a	50.0 ab
12 Untreated Check						0.0 c	0.0 c
LSD (P=Various)	.	.	.	.	.	30.01	22.24
Standard Deviation	.	.	.	.	.	17.13	12.70
CV	.	.	.	.	.	29.8	33.13
Bartlett's X2	.	.	.	.	.	14.475	5.123
P(Bartlett's X2)	.	.	.	.	.	0.025*	0.401
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F						7.163	0.026
Replicate Prob(F)						0.0072	0.9745
Treatment F						8.385	6.258
Treatment Prob(F)						0.0004	0.0018

Means followed by same letter do not differ significantly.

Chart 20. Bermudagrass (*Cynodon dactylon*) height (cm) through 2 MAT.



**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass
Analyses for Treatments 5-12**

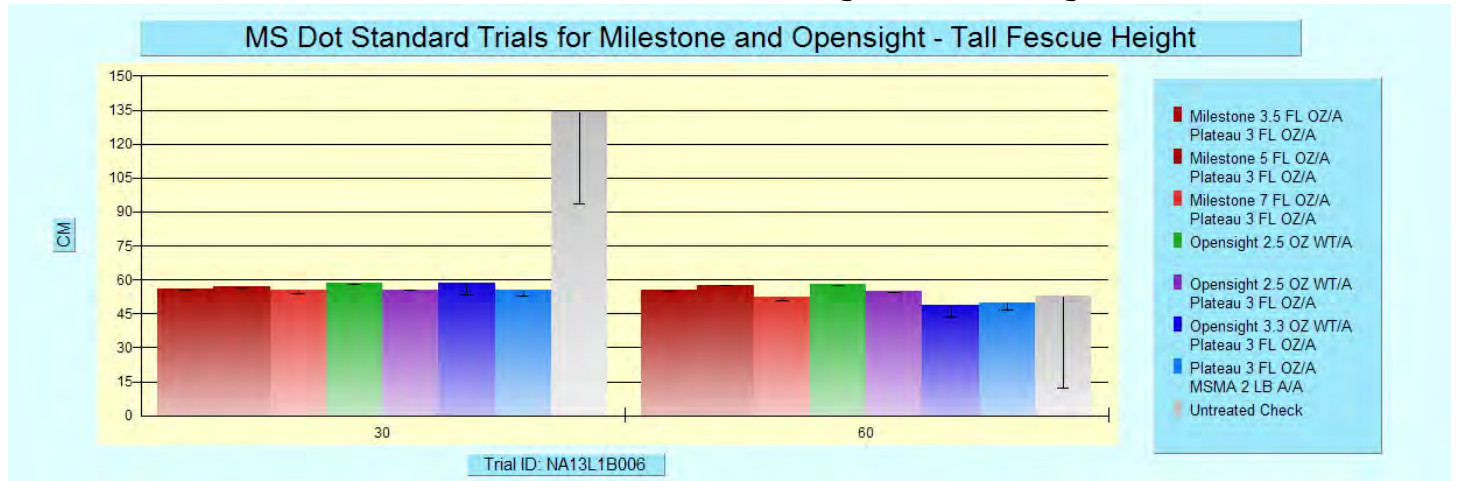
Protocol ID: NA13L1B006
Location: West Point, MS

Trial ID: NA13L1B006
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name				Buckhorn pl>				
Crop Code		CYNDA	CYNDA	FESAR		FESAR	CYNDA	CYNDA
BBCH Scale		BGRM	BGRM	BGRM		BGRM	BGRM	BGRM
Crop Name		Bermuda gra>	Bermuda gra>	Tall fescue		Tall fescue	Bermuda gra>	Bermuda gra>
Rating Date		6/28/13	6/28/13	6/28/13	7/29/13	7/29/13	7/29/13	7/29/13
Rating Data Type		CONTRO	HEIGHT	HEIGHT	CONTRO	CONTRO	CONTRO	HEIGHT
Rating Unit		%	CM	CM	%	%	%	CM
Trt Treatment	Rate							
No. Name	Rate Unit	30	31	32	33	34	35	36
5 Milestone	3.5 fl oz/a	5.0 a	36.7 b	56.0 b	53.3 b	0.0 a	0.0 a	36.0 a
Plateau	3 fl oz/a							
NIS	0.25 % v/v							
6 Milestone	5 fl oz/a	9.3 a	35.3 b	57.0 b	46.7 b	0.0 a	0.0 a	40.3 a
Plateau	3 fl oz/a							
NIS	0.25 % v/v							
7 Milestone	7 fl oz/a	9.7 a	35.0 b	55.7 b	66.7 ab	0.0 a	0.0 a	37.0 a
Plateau	3 fl oz/a							
NIS	0.25 % v/v							
8 Opensight	2.5 oz wt/a	9.7 a	37.3 b	58.3 b	73.3 ab	0.0 a	0.0 a	40.0 a
NIS	0.25 % v/v							
9 Opensight	2.5 oz wt/a	10.0 a	34.7 b	55.7 b	93.3 a	0.0 a	0.0 a	41.3 a
Plateau	3 fl oz/a							
NIS	0.25 % v/v							
10 Opensight	3.3 oz wt/a	6.3 a	37.0 b	58.3 b	93.3 a	0.0 a	0.0 a	37.3 a
Plateau	3 fl oz/a							
NIS	0.25 % v/v							
11 Plateau	3 fl oz/a	8.3 a	37.0 b	55.7 b	88.3 a	0.0 a	0.0 a	36.7 a
MSMA	2 lb ai/a							
NIS	0.25 % v/v							
12 Untreated Check		1.7 a	44.0 a	134.0 a	0.0 c	0.0 a	0.0 a	39.0 a
LSD (P=Various)		5.69	2.75	5.83	30.64	0.00	0.00	7.58
Standard Deviation		3.25	1.57	3.33	17.50	0.00	0.00	4.33
CV		43.35	4.22	5.02	27.18	0.0	0.0	11.26
Bartlett's X2		13.204	4.306	2.369	10.979	0.0	0.0	2.993
P(Bartlett's X2)		0.04*	0.744	0.937	0.089	.	.	0.886
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		0.000	2.898	0.196	7.565	0.000	0.000	0.703
Replicate Prob(F)		1.0000	0.0885	0.8245	0.0059	1.0000	1.0000	0.5119
Treatment F		2.486	10.690	202.916	9.684	0.000	0.000	0.620
Treatment Prob(F)		0.0696	0.0001	0.0001	0.0002	1.0000	1.0000	0.7318

Means followed by same letter do not differ significantly.

Chart 21. Tall fescue (*Schedonorus arundinaceus*) height (cm) through 2 MAT.



**MS Dot Standard Trials for Milestone and Opensight - Bermudagrass
Analyses for Treatments 5-12**

Protocol ID: NA13L1B006

Trial ID: NA13L1B006

Location: West Point, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		FESAR BGRM		CYNDA BGRM	FESAR BGRM	FESAR BGRM	
Crop Code		Tall fescue	Overall Cov>	Bermuda gra>	Tall fescue	Tall fescue	
BBCH Scale		7/29/13	8/28/13	8/28/13	8/28/13	5/13/14	
Crop Name		HEIGHT	GROUND	HEIGHT	HEIGHT	GROUND	
Rating Date		CM	%AREA	CM	CM	%AREA	
Rating Data Type							
Rating Unit							
Trt	Treatment	Rate					
No.	Name	Rate Unit	37	38	39	40	41
5	Milestone Plateau NIS	3.5 fl oz/a 3 fl oz/a 0.25 % v/v	55.3 a	100.0 a	42.7 a	57.3 a	9.0 a
6	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v	57.7 a	100.0 a	39.7 a	61.7 a	5.0 a
7	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v	52.3 a	100.0 a	43.0 a	62.7 a	11.7 a
8	Opensight NIS	2.5 oz wt/a 0.25 % v/v	58.0 a	100.0 a	42.0 a	61.7 a	15.0 a
9	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v	55.0 a	100.0 a	41.7 a	65.0 a	11.7 a
10	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v	48.7 a	100.0 a	39.3 a	65.3 a	15.0 a
11	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v	49.7 a	100.0 a	40.0 a	56.7 a	13.3 a
12	Untreated Check		52.7 a	100.0 a	42.3 a	61.0 a	36.7 a
	LSD (P=Various)		13.08	0.00	4.67	13.87	17.78
	Standard Deviation		7.47	0.00	2.67	7.92	10.15
	CV		13.91	0.0	6.46	12.9	69.23
	Bartlett's X2		6.107	0.0	2.364	7.575	7.407
	P(Bartlett's X2)		0.527	.	0.883	0.372	0.285
	Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F		0.012	0.000	0.392	2.050	3.923
	Replicate Prob(F)		0.9881	1.0000	0.6830	0.1656	0.0444
	Treatment F		0.639	0.000	0.882	0.473	2.617
	Treatment Prob(F)		0.7176	1.0000	0.5445	0.8385	0.0595

Means followed by same letter do not differ significantly.

MS Dot Grass Suppression - Bahiagrass

Protocol ID: NA13L1B008

Trial ID: NA13L1B008

Location:

Study Director: Victor Maddox

Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox

Title: _____

Investigator: John Byrd

Title: _____

Trial Location

City: Crawford

Trial Status: _____

State/Prov.: MS

Trial Reliability: _____

N -Latitude of LL Corner °: 33.299

E -Longitude of LL Corner °: 88.6079

Conducted Under GLP:

Official Trial Code: _____

Conducted Under GEP:

Other Trial Code: _____

Crop Description

Crop 1: PASNO *Paspalum notatum*

Bahiagrass

Site and Design

Plot Width, Unit: 10 FT

Plot Length, Unit: 30 FT

Replications: 3

Study Design: Randomized Complete Block

Application Description

	A
Application Date:	5/28/13
Time of Day:	11:30 am
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	81 F
% Relative Humidity:	50
Wind Velocity, Unit:	3 MPH
Wind Direction:	S
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	0

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	2 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

MS Dot Grass Suppression - Bahiagrass (Continued)

Protocol ID: NA13L1B008
Location:

Trial ID: NA13L1B008
Study Director: Victor Maddox
Investigator: John Byrd

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Milestone	2	LBAE/GAL	SL	3.5	fl oz/a	A	2.188 ml/mx	101	207	303
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	Milestone	2	LBAE/GAL	SL	5	fl oz/a	A	3.125 ml/mx	102	205	307
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	HERB	Milestone	2	LBAE/GAL	SL	7	fl oz/a	A	4.375 ml/mx	103	204	301
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
4	HERB	Opensight	61.95	%AEWW	WG	2.5	oz wt/a	A	1.498 g/mx	104	202	304
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
5	HERB	Opensight	61.95	%AEWW	WG	3.3	oz wt/a	A	1.977 g/mx	105	203	302
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
6	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx	106	201	306
	HERB	MSMA	6	LBA/GAL	SC	2	lb ai/a	A	26.66 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
7	CHK	Untreated Check						A		107	206	305

Study Objectives and Conclusions

Objectives:

Reduce bahiagrass (*Paspalum notatum*) height and thus mowing.

Conclusions:

Damage (control) to bahiagrass was observed by 1 MAT (Chart 22), particularly in treatments with Opensight (46.7% control). This pattern continued through 3 MAT. At 1 MAT bahiagrass height was significantly shorter in all treatments compared to the untreated (Chart 23), indicating that all treatments were effective in reducing height. However, most of this reduction was lost by 3 MAT. All treatments significantly reduced seedhead number compared to the check (Chart 24) through 2 MAT. Even though turf damage was observed, overall cover (Chart 25) in treated plots was not that different than the untreated plots.

All treatments damaged tall fescue (Chart 26) and reduced height compared to the untreated check through 2 MAT (Chart 27). While this indicates treatments reduced the height of both bahiagrass and tall fescue, it is likely that applications made earlier would be more effective at reducing tall fescue height. This is based upon a previous study (page 13) where the first application was applied on March 28, 2013).

All treatments controlled red clover (*Trifolium pratense*) through 2 MAT (Chart 28). Plateau plus MSMA was slightly less effective at 1 MAT (100 percent compared to 80 percent, respectively).

MS Dot Grass Suppression - Bahiagrass (Continued)

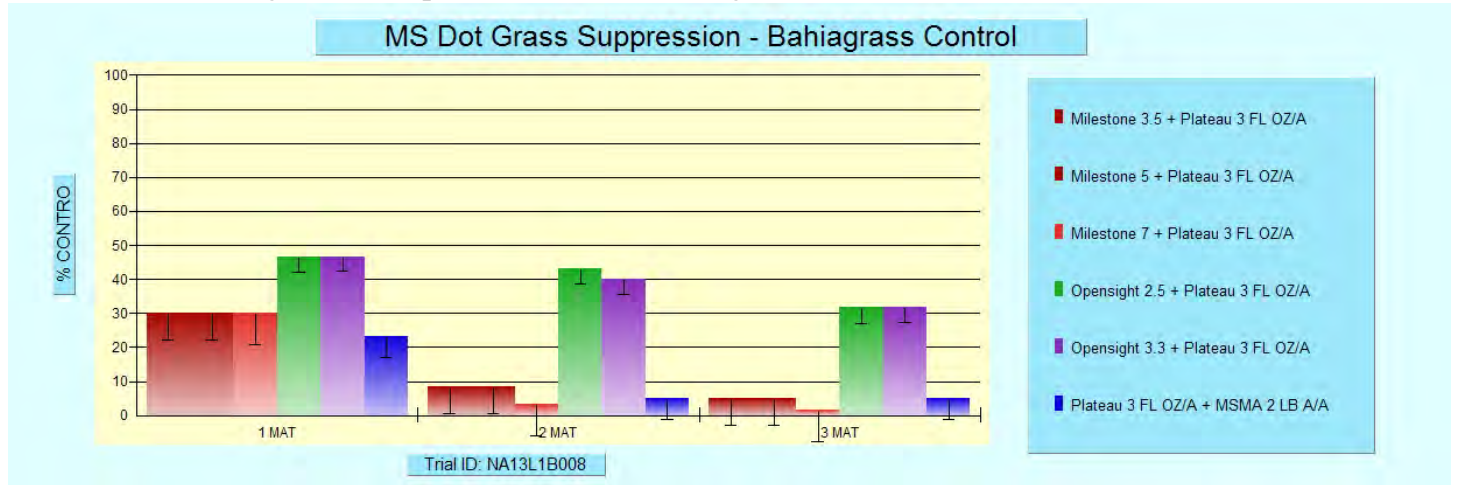
Protocol ID: NA13L1B008
 Location:

Trial ID: NA13L1B008
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name		PASNO	Purple clov>		FESAR	PASNO	Purple clov>		FESAR		
Crop Code		BGRM		Overall Cov>	Tall fescue	BGRM		Overall Cov>	Tall fescue		
BBCH Scale		Bahiagrass		5/28/13	5/28/13	Bahiagrass		6/27/13	6/27/13		
Crop Name		5/28/13	5/28/13	GROUND	GROUND	6/27/13	6/27/13	GROUND	GROUND		
Rating Date		GROUND	GROUND	%AREA	%AREA	CONTRO	CONTRO	%AREA	%AREA		
Rating Data Type		%AREA	%AREA	%AREA	%AREA	%	%	%AREA	%AREA		
Rating Unit		%AREA	%AREA	%AREA	%AREA	%	%	%AREA	%AREA		
Trt	Treatment	Rate	Rate	1	2	3	4	5	6	7	8
No.	Name	Unit	Unit								
1	Milestone	3.5 fl oz/a	3 fl oz/a	50.0	13.3	70.0	15.0	30.0 b	100.0 a	61.7 b	36.7 a
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
2	Milestone	5 fl oz/a	3 fl oz/a	50.0	10.0	70.0	13.3	30.0 b	100.0 a	60.0 b	36.7 a
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
3	Milestone	7 fl oz/a	3 fl oz/a	50.0	11.7	70.0	11.7	30.0 b	100.0 a	60.0 b	43.3 a
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
4	Opensight	2.5 oz wt/a	3 fl oz/a	50.0	10.0	70.0	13.3	46.7 a	100.0 a	61.7 b	46.7 a
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
5	Opensight	3.3 oz wt/a	3 fl oz/a	50.0	15.0	70.0	13.3	46.7 a	100.0 a	60.0 b	50.0 a
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
6	Plateau	3 fl oz/a	2 lb ai/a	50.0	8.3	70.0	15.0	23.3 b	80.0 b	60.0 b	36.7 a
	MSMA	2 lb ai/a									
	NIS	0.25 % v/v									
7	Untreated Check			50.0	11.7	70.0	11.7	0.0	0.0	73.3 a	0.0
LSD (P=Various)				0.00	6.91	0.00	3.17	13.96	12.86	2.97	12.86
Standard Deviation				0.00	3.88	0.00	1.78	7.67	7.07	1.67	7.07
CV				0.0	33.98	0.0	13.36	22.28	7.31	2.67	16.97
Bartlett's X2				0.0	2.435	0.0	0.0	1.485	0.0	0.0	2.064
P(Bartlett's X2)				.	0.786	.	1.00	0.915	.	1.00	0.724
Mean Sep. Test								LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				0.000	4.500	0.000	7.125	1.792	1.000	3.000	2.333
Replicate Prob(F)				1.0000	0.0348	1.0000	0.0091	0.2161	0.4019	0.0878	0.1473
Treatment F				0.000	1.000	0.000	1.750	4.906	4.000	25.857	2.067
Treatment Prob(F)				1.0000	0.4682	1.0000	0.1927	0.0158	0.0297	0.0001	0.1538

Means followed by same letter do not significantly differ.

Chart 22. Bahiagrass (*Paspalum notatum*) damage (control) at 1, 2, and 3 MAT.



MS Dot Grass Suppression - Bahiagrass (Continued)

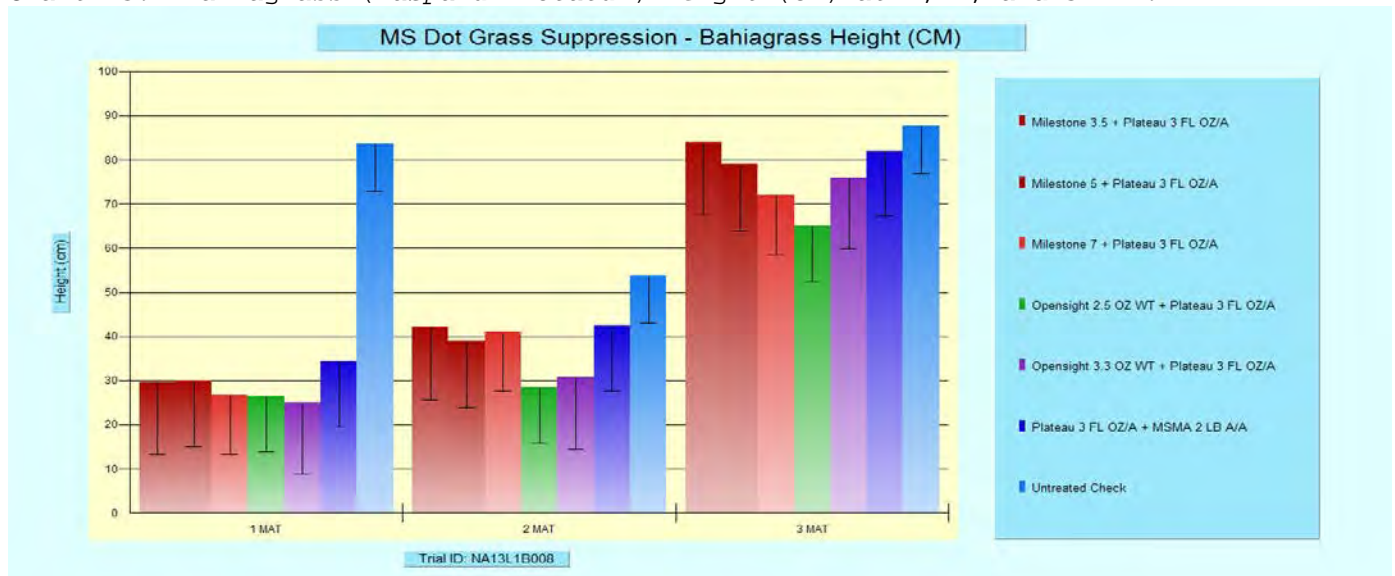
Protocol ID: NA13L1B008
 Location:

Trial ID: NA13L1B008
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name		PASNO BGRM	FESAR BGRM	PASNO BGRM	PASNO BGRM	Purple clov>	Overall Cov>	FESAR BGRM	PASNO BGRM	
Crop Code		Bahiagrass	Tall fescue	Bahiagrass	Bahiagrass		7/26/13	Tall fescue	Bahiagrass	
BBCH Scale		6/27/13	6/27/13	6/27/13	7/26/13	7/26/13	7/26/13	7/26/13	7/26/13	
Crop Name		HEIGHT	HEIGHT	COPLPA	CONTRO	CONTRO	GROUND	CONTRO	HEIGHT	
Rating Date		CM	CM	NUMBER	%	%	%AREA	%	CM	
Rating Data Type										
Rating Unit										
Trt	Treatment	Rate								
No.	Name	Rate Unit	9	10	11	12	13	14	15	16
1	Milestone Plateau NIS	3.5 fl oz/a 3 fl oz/a 0.25 % v/v	29.7 bc	17.7 b	0.0 b	8.3 b	100.0 a	66.7 bc	33.3 a	42.0 b
2	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v	30.0 bc	18.3 b	0.0 b	8.3 b	100.0 a	71.7 b	36.7 a	39.0 b
3	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v	26.7 c	18.0 b	0.0 b	3.3 b	100.0 a	68.3 bc	36.7 a	41.0 b
4	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v	26.3 c	18.7 b	0.0 b	43.3 a	100.0 a	61.7 c	36.7 a	28.3 c
5	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v	25.0 c	17.7 b	0.0 b	40.0 a	100.0 a	61.7 c	36.7 a	30.7 c
6	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v	34.3 b	20.7 b	0.0 b	5.0 b	96.7 a	71.7 b	30.0 a	42.3 b
7	Untreated Check		83.7 a	27.0 a	83.3 a	0.0	0.0	80.0 a	0.0	53.7 a
LSD (P=Various)			6.26	4.55	19.41	15.55	4.29	6.95	19.08	4.13
Standard Deviation			3.52	2.56	10.91	8.55	2.36	3.91	10.49	2.32
CV			9.64	12.97	91.65	47.34	2.37	5.68	29.97	5.87
Bartlett's X2			7.663	9.647	0.0	3.697	0.0	2.434	1.781	5.553
P(Bartlett's X2)			0.264	0.14	.	0.449	.	0.786	0.878	0.475
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			3.336	0.677	1.000	0.247	1.000	0.545	2.879	3.897
Replicate Prob(F)			0.0704	0.5264	0.3966	0.7857	0.4019	0.5933	0.1029	0.0496
Treatment F			106.976	5.223	25.000	13.935	1.000	8.130	0.212	38.984
Treatment Prob(F)			0.0001	0.0074	0.0001	0.0003	0.4651	0.0011	0.9496	0.0001

Means followed by same letter do not significantly differ.

Chart 23. Bahiagrass (*Paspalum notatum*) height (cm) at 1, 2, and 3 MAT.



MS Dot Grass Suppression - Bahiagrass (Continued)

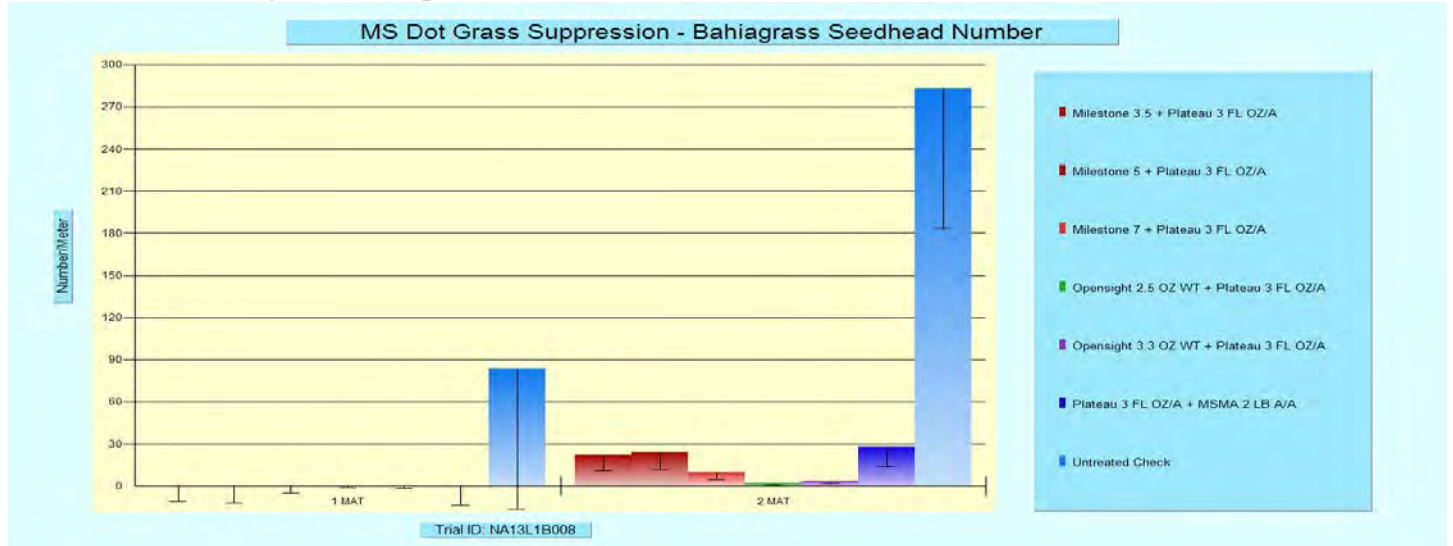
Protocol ID: NA13L1B008
Location:

Trial ID: NA13L1B008
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name	FESAR BGRM	PASNO BGRM	PASNO BGRM	PASNO BGRM	FESAR BGRM	Overall Cov>	FESAR BGRM	PASNO BGRM			
Crop Code	Tall fescue	Bahiagrass	Bahiagrass	Bahiagrass	Tall fescue	5/30/14	Tall fescue	Bahiagrass			
BBCH Scale	7/26/13	7/26/13	8/26/13	8/26/13	8/26/13	GROUND	5/30/14	5/30/14			
Crop Name	HEIGHT	COPLPA	CONTRO	HEIGHT	HEIGHT	%AREA	GROUND	GROUND			
Rating Date	CM	NUMBER	%	CM	CM		%AREA	%AREA			
Rating Data Type											
Rating Unit											
Trt No.	Treatment Name	Rate	Unit	17	18	19	20	21	22	23	24
1	Milestone Plateau NIS	3.5 fl oz/a 3 fl oz/a 0.25 % v/v		20.0 a	22.0 b	5.0 b	84.0 a	29.3 a	66.7 a	18.3 a	46.7 a
2	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v		20.7 a	24.0 b	5.0 b	79.0 a	21.0 c	66.7 a	10.0 a	45.0 a
3	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v		21.3 a	10.0 b	1.7 b	72.0 a	25.7 abc	70.0 a	13.3 a	50.0 a
4	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v		22.3 a	1.7 b	31.7 a	65.0 a	27.0 ab	71.7 a	20.0 a	33.3 a
5	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v		23.0 a	3.3 b	31.7 a	76.0 a	23.0 bc	68.3 a	21.7 a	30.0 a
6	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v		25.7 a	27.7 b	5.0 b	82.0 a	21.0 c	65.0 a	13.3 a	36.7 a
7	Untreated Check			29.3 a	283.3 a	0.0	87.7 a	23.0 bc	73.3 a	15.7 a	40.0 a
LSD (P=Various)				7.70	51.32	9.82	16.71	5.34	6.63	12.94	14.83
Standard Deviation				4.33	28.84	5.40	9.39	3.00	3.73	7.27	8.33
CV				18.67	54.28	40.5	12.05	12.35	5.42	45.32	20.71
Bartlett's X2				18.188	28.746	2.323	5.491	6.854	2.023	5.223	1.784
P(Bartlett's X2)				0.006*	0.001*	0.803	0.483	0.335	0.846	0.516	0.938
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				0.650	1.839	0.143	0.457	3.305	0.600	19.330	15.240
Replicate Prob(F)				0.5393	0.2010	0.8686	0.6435	0.0719	0.5645	0.0002	0.0005
Treatment F				1.724	37.530	20.914	2.016	3.317	1.943	0.982	2.337
Treatment Prob(F)				0.1986	0.0001	0.0001	0.1420	0.0366	0.1542	0.4781	0.0993

Means followed by same letter do not significantly differ.

Chart 24. Bahiagrass (*Paspalum notatum*) seedhead number (m²) at 1 and 2 MAT.



MS Dot Grass Suppression - Bahiagrass (Continued)

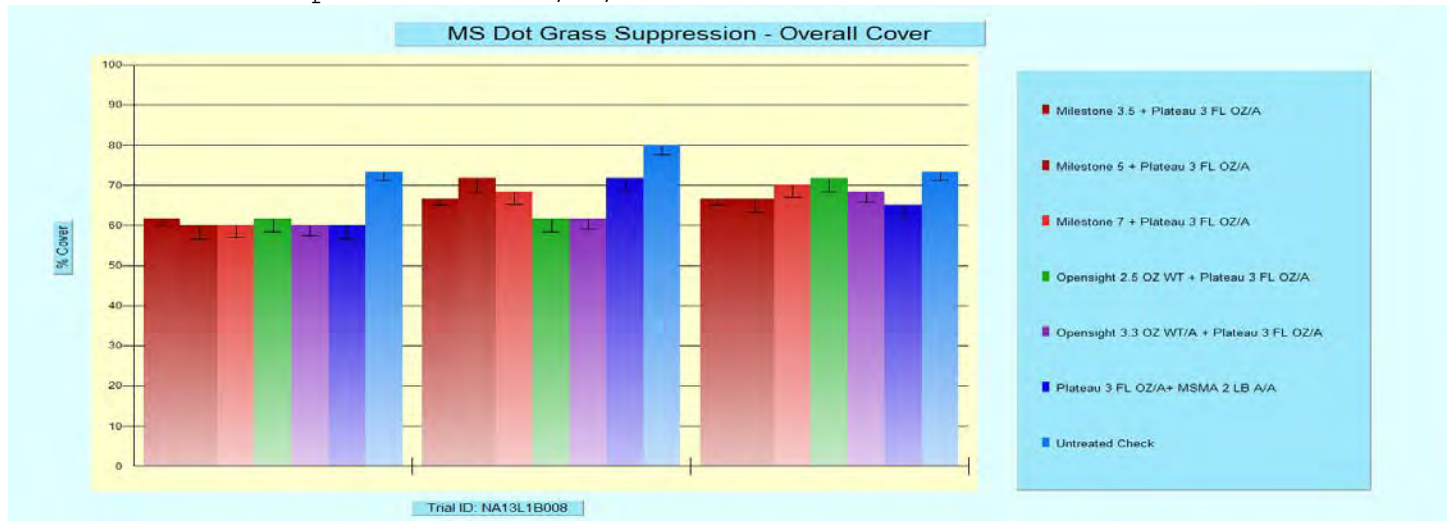
Protocol ID: NA13L1B008
 Location:

Trial ID: NA13L1B008
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Purple clov>		
Crop Code			
BBCH Scale			
Crop Name			
Rating Date	5/30/14		
Rating Data Type	GROUND		
Rating Unit	%AREA		
Trt No.	Treatment Name	Rate	Rate Unit
1	Milestone Plateau NIS	3.5 fl oz/a 3 fl oz/a 0.25 % v/v	2.3 a
2	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v	3.7 a
3	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v	2.7 a
4	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v	1.0 a
5	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v	3.7 a
6	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v	2.3 a
7	Untreated Check		5.7 a
LSD (P=Various)		2.84	
Standard Deviation		1.59	
CV		52.29	
Bartlett's X2		1.009	
P(Bartlett's X2)		0.962	
Mean Sep. Test		LSD.05	
Replicate F		4.631	
Replicate Prob(F)		0.0323	
Treatment F		2.556	
Treatment Prob(F)		0.0785	

Means followed by same letter do not significantly differ.

Chart 25. Overall plot cover at 1, 2, and 3 MAT.



MS Dot Grass Suppression - Bahiagrass (Continued)

Protocol ID: NA13L1B008
 Location:

Trial ID: NA13L1B008
 Study Director: Victor Maddox
 Investigator: John Byrd

Chart 26. Tall fescue (*Schedonorus arundinaceus*) damage (control) at 1 and 2 MAT.

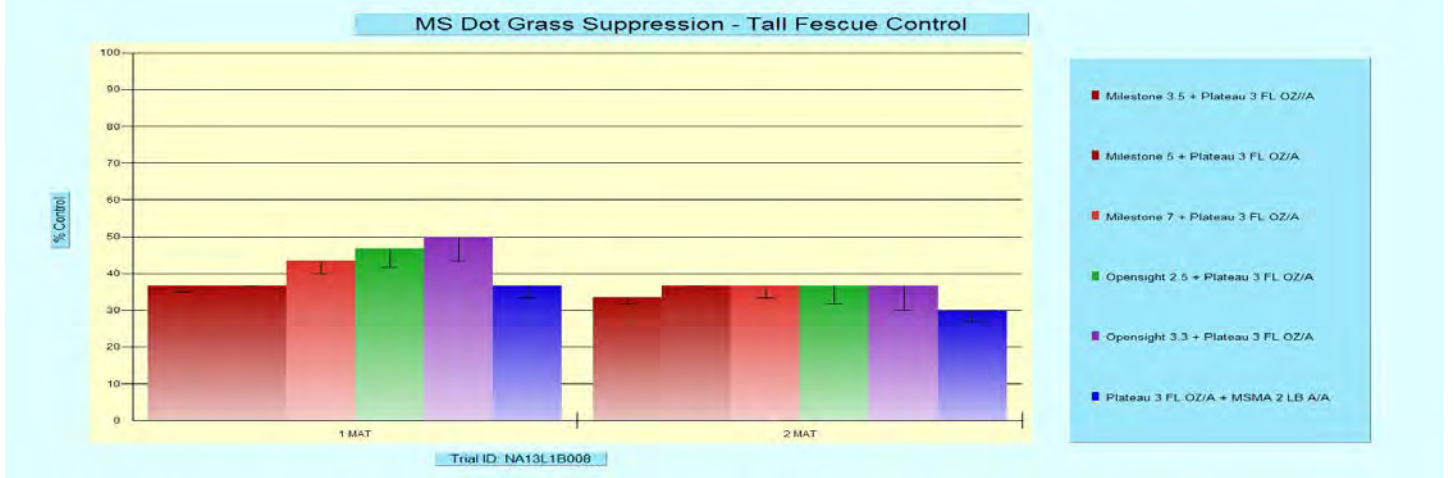


Chart 27. Tall fescue (*Schedonorus arundinaceus*) height (cm) at 1, 2, and 3 MAT.

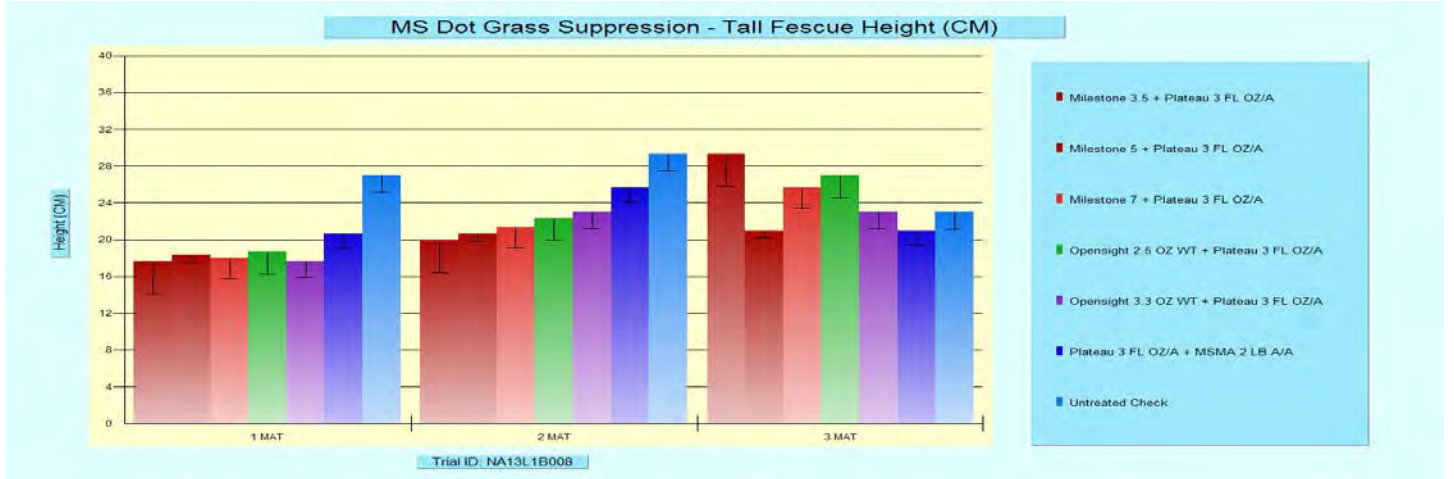
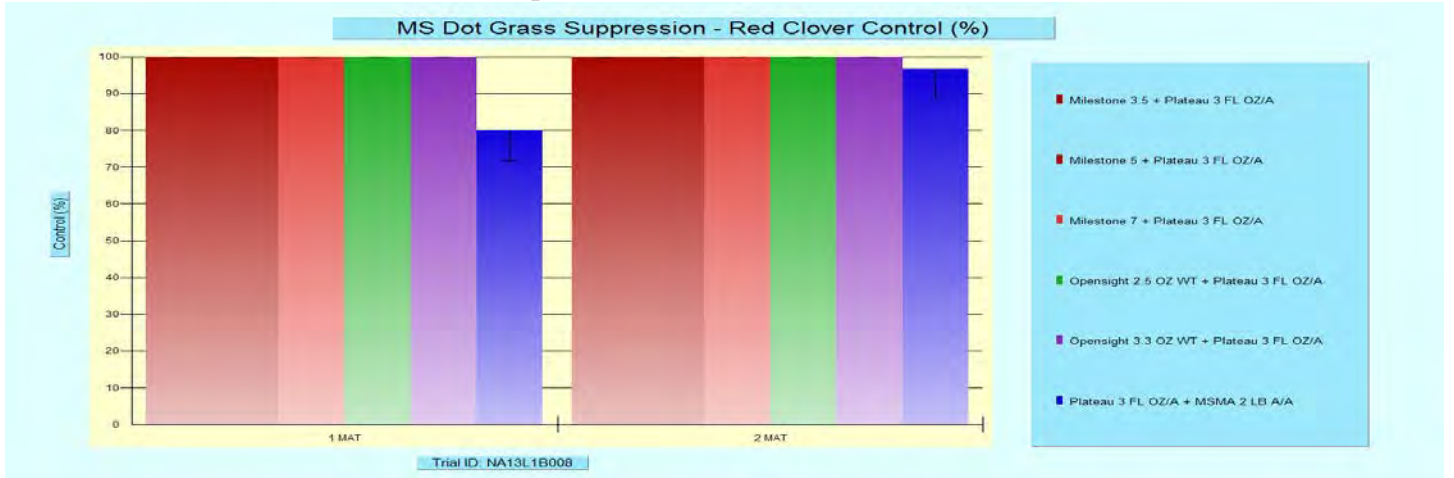


Chart 28. Red clover (*Trifolium pratense*) control at 1 and 2 MAT.



MS Dot Grass Suppression - Bermudagrass

Protocol ID: NA13L1B008
Location:

Trial ID: NA13L1B008
Study Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Title: _____
Title: _____

Trial Location

City: Starkville
State/Prov.: MS
N -Latitude of LL Corner °: 33.4966

Trial Status: _____
Trial Reliability: _____
E -Longitude of LL Corner °: 88.8232

Crop Description

Crop 1: CYNDA *Cynodon dactylon* Bermuda grass

Site and Design

Plot Width, Unit: 10 FT
Plot Length, Unit: 30 FT
Replications: 3

Site Type: _____
Tillage Type: _____
Study Design: Randomized Complete Block

Application Description

A	
Application Date:	5/28/13
Time of Day:	10 AM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	V Maddox
Air Temperature, Unit:	80 F
% Relative Humidity:	50
Wind Velocity, Unit:	3 MPH
Wind Direction:	SE
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	5

Application Equipment

A	
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	2 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

MS Dot Grass Suppression - Bermudagrass (Continued)

Protocol ID: NA13L1B008
Location:

Trial ID: NA13L1B008
Study Director: Victor Maddox
Investigator: John Byrd

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Milestone	2	LBAE/GAL	SL	3.5	fl oz/a	A	2.188 ml/mx	101	207	303
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	Milestone	2	LBAE/GAL	SL	5	fl oz/a	A	3.125 ml/mx	102	205	307
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	HERB	Milestone	2	LBAE/GAL	SL	7	fl oz/a	A	4.375 ml/mx	103	204	301
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
4	HERB	Opensight	61.95	%AEW/W	WG	2.5	oz wt/a	A	1.498 g/mx	104	202	304
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
5	HERB	Opensight	61.95	%AEW/W	WG	3.3	oz wt/a	A	1.977 g/mx	105	203	302
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
6	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	A	1.875 ml/mx	106	201	306
	HERB	MSMA	6	LBA/GAL	SC	2	lb ai/a	A	26.66 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
7	CHK	Untreated Check						A		107	206	305

Study Objectives and Conclusions

Objectives:

Reduce bermudagrass (*Cynodon dactylon*) height and thus potentially reduce mowing.

Conclusions:

Since bermudagrass tends to be shorter, particularly in flower, this study was probably less effective on height reduction compared to the same treatments applied to bahiagrass (*Paspalum notatum*) on the same date (refer to page 27). Damage and height reduction on bermudagrass were minimal in this study (Charts 29 and 30). Some significant differences in damage were observed at 2 MAT, but not at 1 and 3 MAT. There were no significant differences in height through 3 MAT.

All treatments had significantly less overall cover at 1 MAT compared to the untreated plots, but not at 2 and 3 MAT (Chart 31). Since bermudagrass damage was minimal this cover reduction was more likely due to damage to tall fescue and weedy species in the plots.

Similar to the bahiagrass study (page 27), treatments had an effect upon the tall fescue (*Schedonorus arudinaceus*) in this trial (Charts 32 and 33). However, it is possible that applied earlier in the spring may be even more effective in reducing tall fescue height, particularly when flowering. This was manifested in another study (page 13) using similar treatments near West Point, MS, but applied earlier in the spring (28 Mar 2013). At 1 YAT, there were no significant differences in tall fescue cover, although cover was less in treated plots compared to the untreated check.

There was some activity by all treatments upon the buckhorn plantain (*Plantago lanceolata*) in the plots (Chart 34). However, no treatments exceeded 60 percent control through 2 MAT. At 1 YAT, there were no significant differences in buckhorn plantain cover, although cover in untreated plots was higher.

MS Dot Grass Suppression - Bermudagrass (Continued)

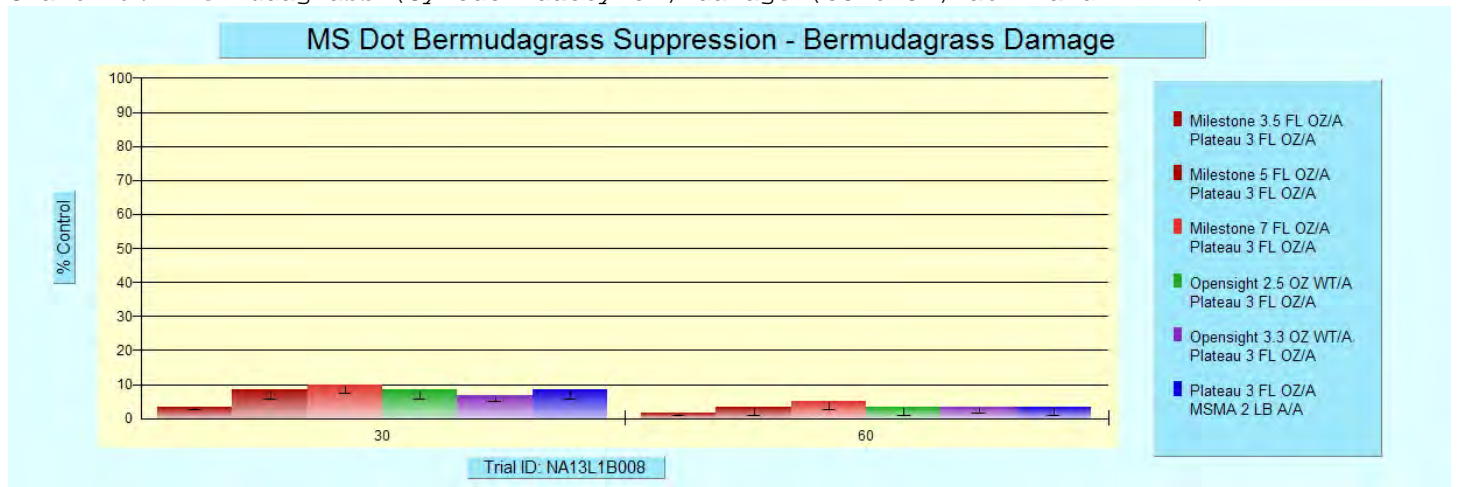
Protocol ID: NA13L1B008
 Location:

Trial ID: NA13L1B008
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name			CYNDA	FESAR	Buckhorn pl>		CYNDA	FESAR	Buckhorn pl>	
Crop Code		overall	BGRM	BGRM		overall	BGRM	BGRM		
BBCH Scale		5/28/13	Bermuda gra>	Tall fescue	5/28/13	6/27/13	Bermuda gra>	Tall fescue	6/27/13	
Crop Name		GROUND	GROUND	GROUND	GROUND	GROUND	CONTRO	CONTRO	CONTRO	
Rating Date		%AREA	%AREA	%AREA	%AREA	%AREA	%	%	%	
Rating Data Type										
Rating Unit										
Trt	Treatment	Rate								
No.	Name	Rate Unit	1	2	3	4	5	6	7	8
1	Milestone	3.5 fl oz/a	80.0	60.0	16.7	10.0	71.7 b	5.0 a	36.7 a	20.0 b
	Plateau	3 fl oz/a								
	NIS	0.25 % v/v								
2	Milestone	5 fl oz/a	80.0	56.7	23.3	15.0	70.0 bc	10.0 a	36.7 a	30.0 b
	Plateau	3 fl oz/a								
	NIS	0.25 % v/v								
3	Milestone	7 fl oz/a	80.0	60.0	13.3	9.0	71.7 b	10.0 a	30.0 a	26.7 b
	Plateau	3 fl oz/a								
	NIS	0.25 % v/v								
4	Opensight	2.5 oz wt/a	80.0	56.7	18.3	11.7	68.3 c	10.0 a	56.7 a	63.3 a
	Plateau	3 fl oz/a								
	NIS	0.25 % v/v								
5	Opensight	3.3 oz wt/a	80.0	60.0	11.7	11.7	70.0 bc	10.0 a	40.0 a	60.0 a
	Plateau	3 fl oz/a								
	NIS	0.25 % v/v								
6	Plateau	3 fl oz/a	80.0	56.7	20.0	11.7	68.3 c	6.7 a	50.0 a	13.3 b
	MSMA	2 lb ai/a								
	NIS	0.25 % v/v								
7	Untreated Check		80.0	56.7	20.0	13.3	80.0 a	0.0	0.0	0.0
	LSD (P=Various)		0.00	5.49	13.19	5.08	3.17	3.95	26.98	16.83
	Standard Deviation		0.00	3.09	7.41	2.86	1.78	2.17	14.83	9.25
	CV		0.0	5.31	42.08	24.3	2.49	25.24	35.6	26.01
	Bartlett's X2		0.0	0.0	9.253	2.017	0.0	0.552	3.354	4.259
	P(Bartlett's X2)		.	1.00	0.16	0.847	1.00	0.457	0.50	0.372
	Mean Sep. Test						LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F		0.000	8.000	12.043	1.510	4.500	2.059	0.000	3.182
	Replicate Prob(F)		1.0000	0.0062	0.0014	0.2600	0.0348	0.1783	1.0000	0.0852
	Treatment F		0.000	1.000	0.903	1.452	15.250	3.118	1.318	15.532
	Treatment Prob(F)		1.0000	0.4682	0.5240	0.2738	0.0001	0.0594	0.3311	0.0002

Means followed by same letter do not significantly differ.

Chart 29. Bermudagrass (*Cynodon dactylon*) damage (control) at 1 and 2 MAT.



MS Dot Grass Suppression - Bermudagrass (Continued)

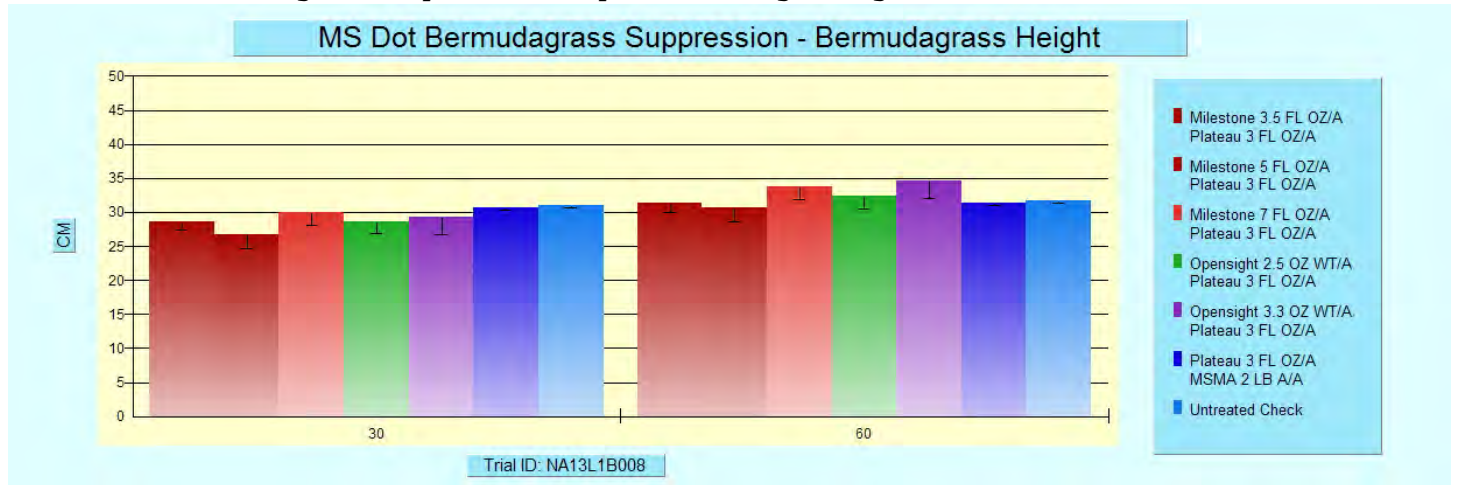
Protocol ID: NA13L1B008
 Location:

Trial ID: NA13L1B008
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name							Buckhorn pl>			
Crop Code		CYNDA	FESAR		CYNDA	FESAR		CYNDA	FESAR	
BBCH Scale		BGRM	BGRM		BGRM	BGRM		BGRM	BGRM	
Crop Name		Bermuda gra>	Tall fescue	overall	Bermuda gra>	Tall fescue		Bermuda gra>	Tall fescue	
Rating Date		6/27/13	6/27/13	7/26/13	7/26/13	7/26/13	7/26/13	6/27/13	6/27/13	
Rating Data Type		HEIGHT	HEIGHT	GROUND	CONTRO	CONTRO	CONTRO	HEIGHT	HEIGHT	
Rating Unit		CM	CM	%AREA	%	%	%	CM	CM	
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	
		Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit	
1	Milestone Plateau NIS	3.5 fl oz/a 3 fl oz/a 0.25 % v/v	29.0 a	32.3 bc	78.3 a	1.7 b	36.7 a	20.0 b	34.0 a	35.0 a
2	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v	26.7 a	29.0 de	73.3 a	5.0 a	36.7 a	30.0 b	30.7 a	34.0 a
3	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v	28.7 a	28.3 de	78.3 a	5.0 a	46.7 a	26.7 b	31.7 a	32.7 a
4	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v	29.7 a	28.0 e	70.0 a	5.0 a	56.7 a	63.3 a	32.3 a	28.7 a
5	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v	29.7 a	31.0 cd	75.0 a	5.0 a	40.0 a	60.0 a	34.0 a	33.3 a
6	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v	30.7 a	34.7 b	70.0 a	1.7 b	50.0 a	13.3 b	31.3 a	34.7 a
7	Untreated Check		30.7 a	40.0 a	81.7 a	0.0	0.0	0.0	31.7 a	39.0 a
LSD (P=Various)			4.42	2.97	10.36	2.71	29.27	16.83	4.43	9.81
Standard Deviation			2.48	1.67	5.82	1.49	16.09	9.25	2.49	5.52
CV			8.48	5.22	7.74	38.33	36.2	26.01	7.72	16.27
Bartlett's X2			9.466	2.024	2.498	0.0	3.102	4.259	1.841	9.389
P(Bartlett's X2)			0.149	0.846	0.777	1.00	0.541	0.372	0.934	0.153
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			4.378	9.120	3.825	2.500	0.536	3.182	1.206	0.715
Replicate Prob(F)			0.0373	0.0039	0.0519	0.1317	0.6007	0.0852	0.3332	0.5088
Treatment F			0.927	19.909	1.754	4.000	0.755	15.532	0.819	0.937
Treatment Prob(F)			0.5098	0.0001	0.1917	0.0297	0.6012	0.0002	0.5756	0.5035

Means followed by same letter do not significantly differ
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Chart 30. Bermudagrass (*Cynodon dactylon*) average height (cm) at 1 and 2 MAT



MS Dot Grass Suppression - Bermudagrass (Continued)

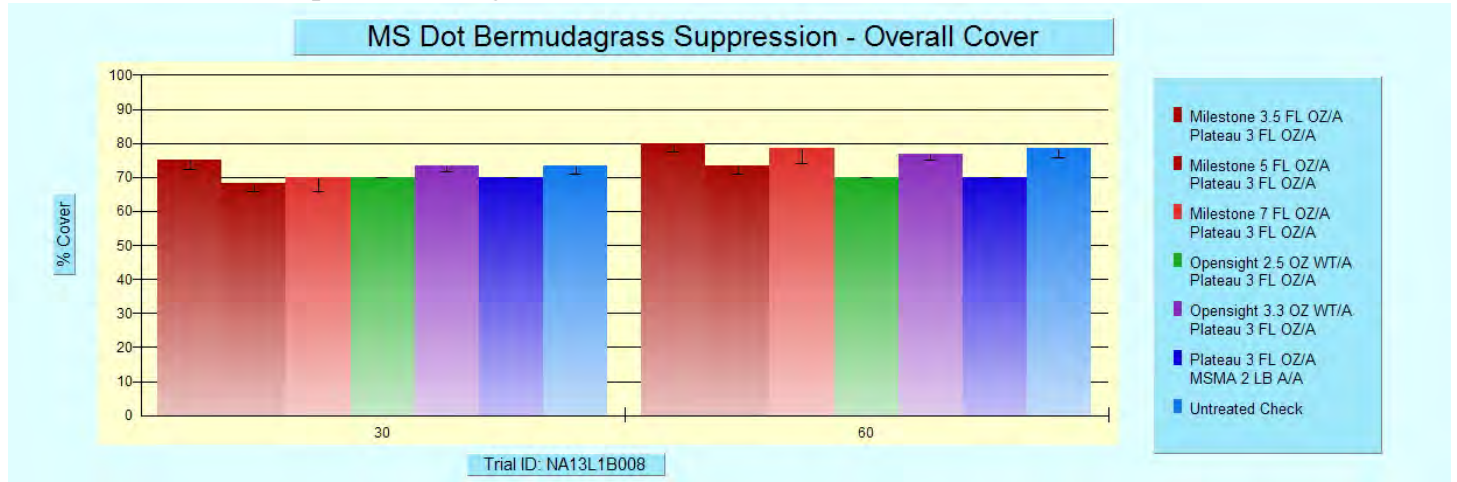
Protocol ID: NA13L1B008
 Location:

Trial ID: NA13L1B008
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name									Buckhorn pl>
Crop Code		CYNDA		CYNDA	FESAR		CYNDA	FESAR	
BBCH Scale		BGRM		BGRM	BGRM		BGRM	BGRM	
Crop Name		Bermuda gra>	overall	Bermuda gra>	Tall fescue	overall	Bermuda gra>	Tall fescue	
Rating Date		8/26/13	8/26/13	8/26/13	8/26/13	5/30/14	5/30/14	5/30/15	5/30/14
Rating Data Type		CONTRO	GROUND	HEIGHT	HEIGHT	GROUND	GROUND	GROUND	GROUND
Rating Unit		%	%AREA	CM	CM	%AREA	%AREA	%AREA	%AREA
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate
		Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit
1	Milestone Plateau NIS	3.5 fl oz/a 3 fl oz/a 0.25 % v/v	0.0 a 91.7 a	38.0 a	38.3 a	76.7 a	41.7 a	25.0 a	16.7 a
2	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v	3.3 a 86.7 a	34.7 a	36.3 a	66.7 a	26.7 bc	18.3 a	18.3 a
3	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v	0.0 a 88.3 a	35.3 a	37.7 a	76.7 a	46.7 a	13.3 a	13.3 a
4	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v	3.3 a 85.0 a	38.3 a	38.0 a	73.3 a	40.0 ab	21.7 a	5.0 a
5	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v	1.7 a 90.0 a	35.0 a	36.7 a	73.3 a	36.7 abc	15.0 a	2.7 a
6	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v	1.7 a 86.7 a	33.3 a	35.7 a	73.3 a	36.7 abc	12.3 a	13.3 a
7	Untreated Check		0.0 88.3 a	40.7 a	43.7 a	83.3 a	23.3 c	28.3 a	21.7 a
LSD (P=Various)			4.39	6.77	6.10	11.80	10.27	13.77	15.36
Standard Deviation			2.42	3.81	3.43	6.63	5.77	7.74	8.63
CV			144.91	4.32	9.41	17.43	7.72	21.53	45.09
Bartlett's X2			0.0	3.128	3.203	9.971	1.909	2.419	3.931
P(Bartlett's X2)			1.00	0.793	0.669	0.126	0.928	0.877	0.686
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			0.714	5.507	1.533	0.638	4.000	6.934	24.123
Replicate Prob(F)			0.5129	0.0201	0.2553	0.5456	0.0467	0.0100	0.0001
Treatment F			1.143	1.041	1.698	0.481	2.286	3.424	1.497
Treatment Prob(F)			0.3993	0.4462	0.2048	0.8103	0.1051	0.0331	0.2596

Means followed by same letter do not significantly differ
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Chart 31. Overall plot coverage at 1 and 2 MAT.



MS Dot Grass Suppression - Bermudagrass (Continued)

Protocol ID: NA13L1B008
 Location:

Trial ID: NA13L1B008
 Study Director: Victor Maddox
 Investigator: John Byrd

Chart 32. Tall fescue (*Schedonorus arundinaceus*) damage (control) at 1 and 2 MAT.

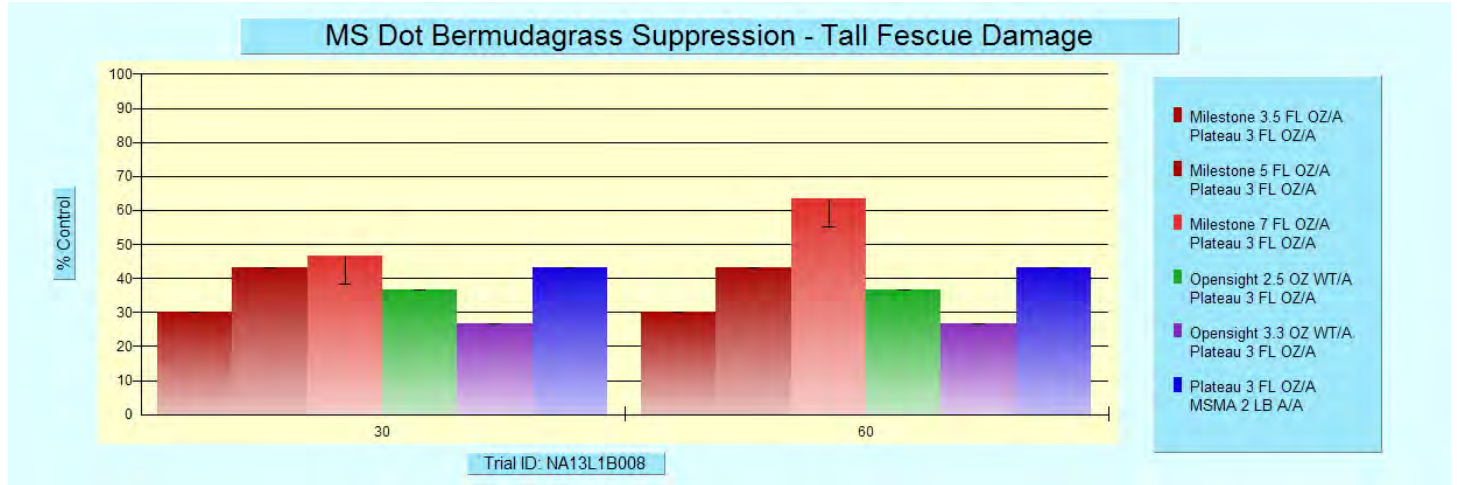


Chart 33. Tall fescue (*Schedonorus arundinaceus*) height (cm) at 1 and 2 MAT.

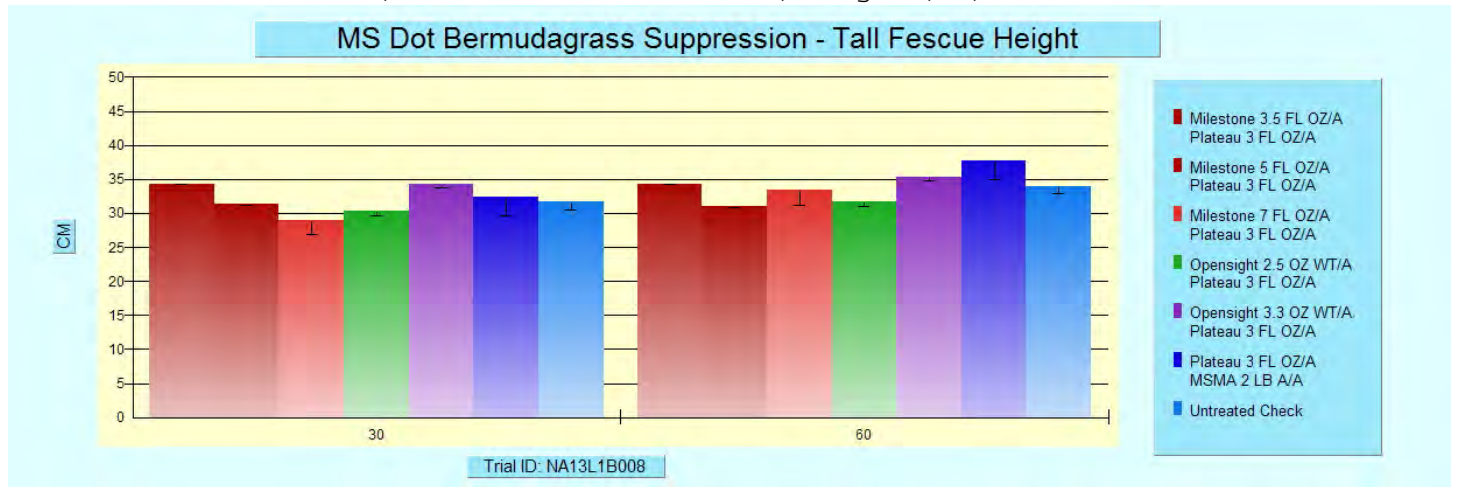
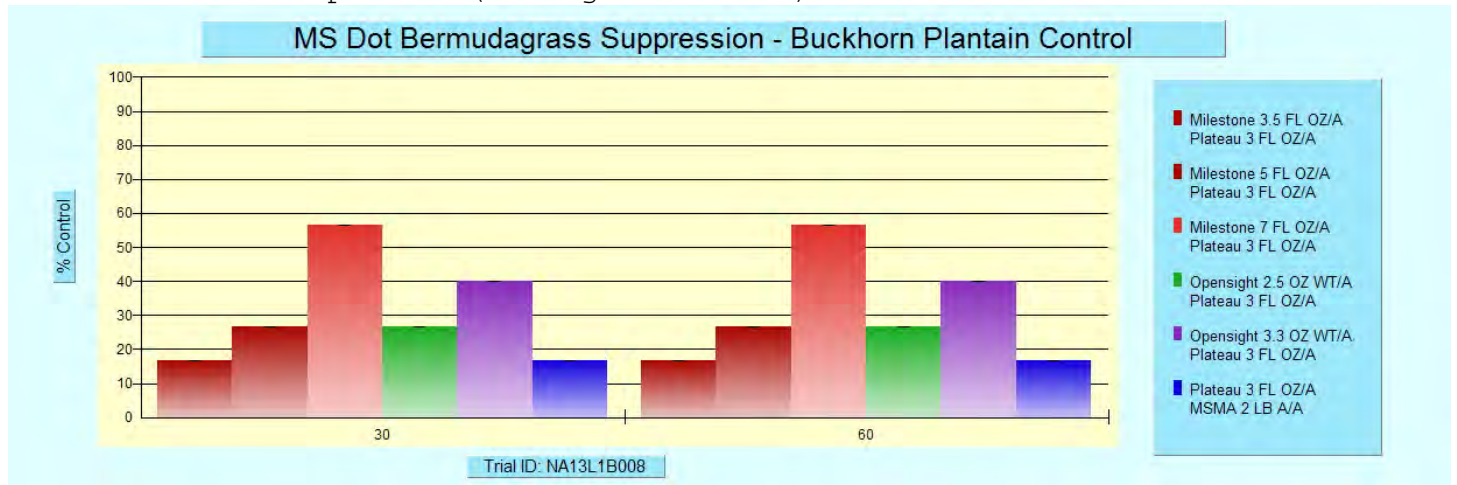


Chart 34. Buckhorn plantain (*Plantago lanceolata*) control at 1 and 2 MAT.



Bareground for annual grass control	
Protocol ID: USA-13-412	Trial ID: USA-13-412
Location: Starkville, MS	Study Director: Victor Maddox
	Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Trial Location

City: Starkville
State/Prov.: MS

Conducted Under GLP: **Official Trial Code:** _____
Conducted Under GEP: **Other Trial Code:** _____

Site and Design

Plot Width, Unit: 10 FT **Site Type:** Bareground
Plot Length, Unit: 30 FT **Tillage Type:** None
Replications: 3 **Study Design:** Randomized Complete Block

Application Description

	A
Application Date:	5/30/13
Time of Day:	8:00 AM
Application Method:	SPRAY
Application Timing:	NCPOPE
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	75 F
% Relative Humidity:	40
Wind Velocity, Unit:	4 MPH
Wind Direction:	S
Dew Presence (Y/N):	N
Soil Moisture:	INADEQUATE
% Cloud Cover:	70

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Bareground for annual grass control (Continued)

Protocol ID: USA-13-412

Trial ID: USA-13-412

Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Hyvar X	80	%AW/W	WP	2	lb/a	A	19.17 g/mx	101	207	310
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
2	HERB	Hyvar X	80	%AW/W	WP	4	lb/a	A	38.34 g/mx	102	203	311
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
3	HERB	Hyvar X	80	%AW/W	WP	2	lb/a	A	19.17 g/mx	103	206	307
	HERB	DPX-MAT28	50	%	SG	7.9	oz wt/a	A	4.733 g/mx			
	HERB	Telar	75	%AW/W	WG	2.07	oz wt/a	A	1.24 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
4	HERB	Hyvar X	80	%AW/W	WP	4	lb/a	A	38.34 g/mx	104	211	309
	HERB	DPX-MAT28	50	%	SG	7.9	oz wt/a	A	4.733 g/mx			
	HERB	Telar	75	%AW/W	WG	2.07	oz wt/a	A	1.24 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
5	HERB	Esplanade	1.67	LB/GAL	SC	5	fl oz/a	A	3.125 ml/mx	105	212	303
	HERB	DPX-MAT28	50	%	SG	7.9	oz wt/a	A	4.733 g/mx			
	HERB	Telar	75	%AW/W	WG	2.07	oz wt/a	A	1.24 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
6	HERB	Esplanade	1.67	LBA/GAL	SC	7	fl oz/a	A	4.375 ml/mx	106	201	302
	HERB	DPX-MAT28	50	%	SG	7.9	oz wt/a	A	4.733 g/mx			
	HERB	Telar	75	%AW/W	WG	2.07	oz wt/a	A	1.24 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
7	HERB	Arsenal Powerline	2	LBA/GAL	EC	1	lb ai/a	A	40.0 ml/mx	107	210	304
	HERB	DPX-MAT28	50	%	SG	7.9	oz wt/a	A	4.733 g/mx			
	HERB	Telar	75	%AW/W	WG	2.07	oz wt/a	A	1.24 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
8	HERB	Velpar DF	75	%AW/W	WG	4	lb/a	A	38.34 g/mx	108	205	301
	HERB	DPX-MAT28	50	%	SG	7.9	oz wt/a	A	4.733 g/mx			
	HERB	Telar	75	%AW/W	WG	2.07	oz wt/a	A	1.24 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
9	HERB	Oust XP	75	%AW/W	SG	3.6	oz wt/a	A	2.157 g/mx	109	202	308
	HERB	DPX-MAT28	50	%	SG	9.0	oz wt/a	A	5.392 g/mx			
	HERB	Telar	75	%AW/W	WG	1.8	oz wt/a	A	1.078 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
10	HERB	Piper	76	%AW/W	WG	10	oz wt/a	A	5.991 g/mx	110	209	312
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
11	HERB	Krovar I	80	%AW/W	WG	8	lb/a	A	76.69 g/mx	111	204	306
	HERB	Accord XRT	5.4	LB/GAL	SL	1	qt/a	A	20.0 ml/mx			
12	CHK	Untreated Check								112	208	305

Note: Treatment 9 without Accord XRT is now referred to as Plainview.

Bareground for annual grass control (Continued)

Protocol ID: USA-13-412

Trial ID: USA-13-412

Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Overall 5/30/13 GROUND %AREA	Brazil verv> 5/30/13 GROUND %AREA	Dichanthei> 5/30/13 GROUND %AREA	Italian rye> 5/30/13 GROUND %AREA	Linear-leaf> 5/30/13 GROUND %AREA	Overall 7/15/13 GROUND %AREA	Brazil verv> 7/15/13 CONTRO %	Mecardonia > 7/15/13 GROUND %AREA		
Rating Date											
Rating Data Type											
Rating Unit											
Trt No.	Treatment Name	Rate	Unit	1	2	3	4	5	6	7	8
1	Hyvar X Accord XRT	2 lb/a 1 qt/a		78.3	16.7	21.7	5.3	18.3	5.0 bc	53.3 b	4.0 b
2	Hyvar X Accord XRT	4 lb/a 1 qt/a		80.0	13.3	21.7	4.0	21.7	11.7 bc	60.0 b	3.0 b
3	Hyvar X DPX-MAT28 Telar Accord XRT	2 lb/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		80.0	12.7	20.0	4.0	23.3	24.0 b	100.0 a	0.0 b
4	Hyvar X DPX-MAT28 Telar Accord XRT	4 lb/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		78.3	14.0	16.7	3.0	23.3	0.7 c	100.0 a	0.0 b
5	Esplanade DPX-MAT28 Telar Accord XRT	5 fl oz/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		78.3	15.7	11.7	3.3	25.0	8.7 bc	100.0 a	0.0 b
6	Esplanade DPX-MAT28 Telar Accord XRT	7 fl oz/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		80.0	14.7	13.3	4.0	31.7	6.7 bc	100.0 a	0.0 b
7	Arsenal Powerline DPX-MAT28 Telar Accord XRT	1 lb ai/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		78.3	17.3	15.0	2.3	28.3	1.0 c	100.0 a	0.0 b
8	Velpar DF DPX-MAT28 Telar Accord XRT	4 lb/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		80.0	12.3	13.3	3.0	33.3	1.7 c	100.0 a	0.0 b
9	Oust XP DPX-MAT28 Telar Accord XRT	3.6 oz wt/a 9.0 oz wt/a 1.8 oz wt/a 1 qt/a		80.0	11.3	15.0	3.7	30.0	1.7 c	100.0 a	0.0 b
10	Piper Accord XRT	10 oz wt/a 1 qt/a		80.0	12.3	13.3	3.0	27.3	7.3 bc	80.0 ab	1.0 b
11	Krovar I Accord XRT	8 lb/a 1 qt/a		80.0	12.3	13.3	5.7	30.0	10.0 bc	76.3 ab	2.7 b
12	Untreated Check			78.3	15.7	15.0	5.0	30.0	98.3 a	0.0	11.7 a
	LSD (P=Various)			2.52	8.53	8.97	2.92	12.32	19.21	28.47	4.24
	Standard Deviation			1.49	5.03	5.29	1.73	7.28	11.35	16.71	2.50
	CV			1.87	35.89	33.44	44.73	27.09	77.06	18.96	134.55
	Bartlett's X2			0.0	1.677	2.399	10.233	1.005	46.731	2.312	6.659
	P(Bartlett's X2)			1.00	0.999	0.997	0.51	1.00	0.001*	0.315	0.155
	Mean Sep. Test								LSD.05	LSD.05	LSD.05
	Replicate F			7.857	126.958	82.351	17.054	53.014	3.876	1.969	0.270
	Replicate Prob(F)			0.0027	0.0001	0.0001	0.0001	0.0001	0.0361	0.1658	0.7657
	Treatment F			1.000	0.451	1.270	1.066	1.159	17.134	3.430	5.553
	Treatment Prob(F)			0.4767	0.9141	0.3033	0.4288	0.3675	0.0001	0.0091	0.0003

Means followed by same letter do not differ significantly.

Bareground for annual grass control (Continued)

Protocol ID: USA-13-412

Trial ID: USA-13-412

Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Rustweed 7/15/13 GROUND %AREA	Overall 8/28/13 GROUND %AREA	Fall panicum 8/28/13 GROUND %AREA	Broadleaf s> 8/28/13 GROUND %AREA	Mecardonia > 8/28/13 GROUND %AREA	Digitaria c> 8/28/13 GROUND %AREA	Echinochloa> 8/28/13 GROUND %AREA	annual gras> 8/28/13 GROUND %AREA		
Rating Date											
Rating Data Type											
Rating Unit											
Trt No.	Treatment Name	Rate	Unit	9	10	11	12	13	14	15	16
1	Hyvar X Accord XRT	2 lb/a 1 qt/a		4.3 b	40.0 bc	6.7 a	18.3 a	6.7 a	8.3 a	6.7 b	41.7 a
2	Hyvar X Accord XRT	4 lb/a 1 qt/a		1.0 b	30.0 bcd	0.0 a	3.3 a	18.3 a	0.0 a	0.0 b	3.3 c
3	Hyvar X DPX-MAT28 Telar Accord XRT	2 lb/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		0.0 b	33.3 bcd	3.3 a	11.7 a	1.3 a	5.0 a	8.3 b	28.3 ab
4	Hyvar X DPX-MAT28 Telar Accord XRT	4 lb/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		0.0 b	32.0 bcd	0.3 a	0.3 a	23.3 a	0.7 a	0.0 b	1.3 c
5	Esplanade DPX-MAT28 Telar Accord XRT	5 fl oz/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		0.0 b	2.7 d	0.0 a	2.3 a	0.0 a	0.0 a	0.0 b	2.3 c
6	Esplanade DPX-MAT28 Telar Accord XRT	7 fl oz/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		0.0 b	2.0 d	0.0 a	1.7 a	0.0 a	0.0 a	0.0 b	1.7 c
7	Arsenal Powerline DPX-MAT28 Telar Accord XRT	1 lb ai/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		0.0 b	0.3 d	0.3 a	0.0 a	0.0 a	0.0 a	0.0 b	0.3 c
8	Velpar DF DPX-MAT28 Telar Accord XRT	4 lb/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		0.0 b	3.3 cd	0.0 a	3.3 a	0.0 a	0.0 a	0.0 b	3.3 c
9	Oust XP DPX-MAT28 Telar Accord XRT	3.6 oz wt/a 9.0 oz wt/a 1.8 oz wt/a 1 qt/a		0.0 b	8.3 cd	2.0 a	5.0 a	0.0 a	0.3 a	1.3 b	8.0 bc
10	Piper Accord XRT	10 oz wt/a 1 qt/a		1.0 b	56.7 ab	13.3 a	8.3 a	1.7 a	5.0 a	26.7 a	51.7 a
11	Krovar I Accord XRT	8 lb/a 1 qt/a		0.0 b	30.0 bcd	0.0 a	5.0 a	14.0 a	0.0 a	0.0 b	5.0 bc
12	Untreated Check			26.7 a	91.7 a	8.3 a	20.0 a	38.3 a	5.0 a	3.3 b	33.3 a
LSD (P=Various)				10.41	36.82	9.75	20.67	25.01	6.02	14.10	24.57
Standard Deviation				6.15	21.75	5.76	12.20	14.77	3.55	8.33	14.51
CV				223.47	78.99	201.28	184.61	170.95	175.18	215.63	96.57
Bartlett's X2				16.292	48.338	23.231	30.189	23.577	13.026	11.615	46.511
P(Bartlett's X2)				0.001*	0.001*	0.001*	0.001*	0.001*	0.023*	0.02*	0.001*
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				1.278	0.383	2.297	2.082	1.086	3.661	2.124	0.740
Replicate Prob(F)				0.2986	0.6864	0.1241	0.1486	0.3550	0.0424	0.1435	0.4886
Treatment F				4.630	4.699	1.717	0.911	2.125	2.067	2.593	4.832
Treatment Prob(F)				0.0011	0.0010	0.1351	0.5460	0.0638	0.0708	0.0275	0.0008

Means followed by same letter do not differ significantly.

Bareground for annual grass control (Continued)

Protocol ID: USA-13-412

Trial ID: USA-13-412

Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Overall	annual gras>	Overall	Brazil verv>	Mecardonia >	annual gras>		
Rating Date		10/11/13	10/11/13	5/30/14	5/30/14	5/30/14	5/30/14		
Rating Data Type		GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit		%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Trt No.	Treatment Name	Rate	Unit	17	18	19	20	21	22
1	Hyvar X Accord XRT	2 lb/a 1 qt/a		83.3 ab	66.7 a	76.7 ab	8.3 a	8.3 bc	23.3 a
2	Hyvar X Accord XRT	4 lb/a 1 qt/a		70.0 abc	16.7 bcd	66.7 bc	13.3 a	21.7 a	26.7 a
3	Hyvar X DPX-MAT28 Telar Accord XRT	2 lb/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		66.7 bc	43.3 abc	53.3 c	0.0 a	1.7 c	15.0 a
4	Hyvar X DPX-MAT28 Telar Accord XRT	4 lb/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		53.3 bc	7.3 d	60.0 bc	13.3 a	6.7 bc	10.3 a
5	Esplanade DPX-MAT28 Telar Accord XRT	5 fl oz/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		7.7 d	2.7 d	60.0 bc	0.0 a	0.0 c	35.3 a
6	Esplanade DPX-MAT28 Telar Accord XRT	7 fl oz/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		6.0 d	4.3 d	60.0 bc	0.0 a	0.0 c	37.0 a
7	Arsenal Powerline DPX-MAT28 Telar Accord XRT	1 lb ai/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		7.3 d	4.0 d	63.3 bc	0.0 a	0.0 c	38.3 a
8	Velpar DF DPX-MAT28 Telar Accord XRT	4 lb/a 7.9 oz wt/a 2.07 oz wt/a 1 qt/a		12.3 d	10.0 cd	50.0 c	0.0 a	0.0 c	26.7 a
9	Oust XP DPX-MAT28 Telar Accord XRT	3.6 oz wt/a 9.0 oz wt/a 1.8 oz wt/a 1 qt/a		38.3 cd	35.0 a-d	53.3 c	0.0 a	0.0 c	16.7 a
10	Piper Accord XRT	10 oz wt/a 1 qt/a		70.0 abc	65.0 a	66.7 bc	2.0 a	3.3 c	2.0 a
11	Krovar I Accord XRT	8 lb/a 1 qt/a		53.3 bc	5.0 d	56.7 c	13.3 a	10.0 abc	17.0 a
12	Untreated Check			100.0 a	48.3 ab	86.7 a	28.3 a	18.3 ab	2.3 a
LSD (P=Various)		33.19		35.33	17.04	22.23	12.24	31.93	
Standard Deviation		19.60		20.86	10.06	13.13	7.23	18.86	
CV		41.38		81.19	16.03	200.28	123.94	90.27	
Bartlett's X2		23.769		31.716	11.399	11.924	9.11	17.158	
P(Bartlett's X2)		0.008*		0.001*	0.249	0.036*	0.167	0.103	
Mean Sep. Test		LSD.05		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	
Replicate F		0.918		0.203	2.496	1.900	0.478	2.776	
Replicate Prob(F)		0.4140		0.8181	0.1054	0.1733	0.6262	0.0841	
Treatment F		8.328		4.189	3.222	1.414	3.261	1.323	
Treatment Prob(F)		0.0001		0.0021	0.0094	0.2349	0.0088	0.2762	

Means followed by same letter do not differ significantly.

Bareground for annual grass control (Continued)

Protocol ID: USA-13-412

Trial ID: USA-13-412

Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Study Objectives and Conclusions**Objectives:**

Season-long control of annual grasses.

Conclusions:

There was no significant herbicide treatment differences in cover at 45 DAT. Cover in herbicide treated plots ranged from 0.7 to 24 percent (Figure 1). Most treatments provided 100 percent control of Brazilian vervain (*Verbena brasiliensis*), Mecardonia (*Mecardonia acuminata*), and rustweed (*Polypremum procumbens*) at 45 DAT (Figure 2).

Overall cover at 1 YAT was lower in treated plots, but the lowest on average was 50 percent, indicating no treatment was acceptable at 1 YAT and retreatment would be required (Figure 3). Some treatments were effective at controlling *Verbena brasiliensis* and/or *Mecardonia acuminata* but unfortunately the same treatments tended to release annual grass cover by 1 YAT (Figure 4).

Figure 1. Image of plots from side at 45 DAT, showing alternating green and brown strips from herbicide treatments.



Bareground for annual grass control (Continued)

Protocol ID: USA-13-412	Trial ID: USA-13-412
Location: Starkville, MS	Study Director: Victor Maddox
	Investigator: John Byrd

Figure 2. Example of a relatively clean treated plot at 45 DAT.



Figure 3. Study at 1 YAT illustrating the need for retreat application(s).



Bareground for annual grass control (Continued)

Protocol ID: USA-13-412

Trial ID: USA-13-412

Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Figure 4. Plot at 1 YAT showing release of annual grasses.



Perspective Roadside Programs in Bahiagrass

Protocol ID: USA-13-417
Location: Wiggins, MS

Trial ID: USA-13-417
Study Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Trial Location

City: Wiggins
State/Prov.: MS

Trial Status: _____

Trial Reliability: _____

Directions: South of Wiggins, MS, on Hwy 67 approximately 1 mile south of Hwy 49 Jct.

Conducted Under GLP:
Conducted Under GEP:

Official Trial Code: _____

Other Trial Code: _____

Results and Discussion

This study includes one treatment that received two herbicide applications (A and B). It will be referred to as 'Trt 2' in the following text of this section. 'MAT' refers to the first application.

Bahiagrass Responses

At 1 MAT, bahiagrass (*Paspalum notatum*) damage (control) was observed at around 30 percent (Chart 35) and overall groundcover was significantly reduced (Chart 36). Bahiagrass height (Chart 37) was also significantly reduced. By 3 MAT, bahiagrass damage was minimal and overall cover, although significant, was only 6.7 percent less than the untreated. This trend was similar for height, except there were no significant differences between herbicide treatments and the untreated.

AT 1 month after the second application, bahiagrass height was significantly reduced in Trt 2 compared to the untreated as was overall cover. Significant damage (25%) to bahiagrass was also observed in Trt 2. Seedhead number was reduced to 0 (Chart 38), but was not significantly different than the single application treatments.

There were no significant differences in bahiagrass height, control, or overall cover at 6 MAT. No significant difference in bahiagrass cover was observed at one year after the first treatment.

Weed Responses - Annual

Only one annual weed was rated in this study, *Trifolium campestre* or large hop clover. It comprised approximately 20 percent of the overall cover at initiation. All herbicide treatments had 100 percent control at 1 MAT (Chart 39).

Weed Responses - Perennial

Two species of perennial weeds were rated during the study, Canada goldenrod (*Solidago canadensis*) and vaseygrass (*Paspalum urvillei*).

Up to 40 percent control of goldenrod was observed at 1 MAT (Chart 40) with no significant differences between herbicide treatments. At 3 MAT, control of goldenrod had increased to 90 percent in the 5 oz/A Perspective treatment, but there was no significant differences between herbicide treatments. At 6 MAT, 100 percent control was observed in all herbicide treatments. At 1 year after initial treatment, goldenrod cover was significantly less than the untreated ranging from 1.7 to 3.3 on average in treated compared to 63.3 on average in untreated plots.

At 3 MAT, some control of vaseygrass was observed but it was less than 17 percent and there were no significant differences between herbicide treatments. Control was better 1 month after the second application in Trt 2, but it was not significantly better than the single application treatments. This trend remained through 6 MAT.

Overall Conclusion

Damage occurred in this study, but bahiagrass recovered. The control of broadleaf weeds in this study was excellent, but not very effective on vaseygrass. There were responses to the second application, but was likely not necessary under the conditions in this study.

Perspective Roadside Programs in Bahiagrass (Continued)

Protocol ID: USA-13-417
Location: Wiggins, MS

Trial ID: USA-13-417
Study Director: Victor Maddox
Investigator: John Byrd

Crop Description

Crop 1: PASNO *Paspalum notatum* Bahiagrass

Site and Design

Plot Width, Unit: 10 FT
Plot Length, Unit: 30 FT
Replications: 3

Study Design: Randomized Complete Block

Application Description

	A	B
Application Date:	4/19/13	8/7/13
Time of Day:	2 PM	12:30 PM
Application Method:	SPRAY	SPRAY
Application Timing:	PREPOS	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	V.Maddox	V. Maddox
Air Temperature, Unit:	46 F	93 F
% Relative Humidity:	63	70
Wind Velocity, Unit:	2.8 MPH	2 MPH
Wind Direction:	NW	SE
Dew Presence (Y/N):	Y	N
Soil Temperature, Unit:	60 F	
Soil Moisture:	Adequate	Adequate
% Cloud Cover:	90	60

Application Equipment

	A	B
Appl. Equipment:	Backpack	Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	2003	2003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Tank Mix (Y/N):	Y	Y

Perspective Roadside Programs in Bahiagrass (Continued)

Protocol ID: USA-13-417
 Location: Wiggins, MS

Trial ID: USA-13-417
 Study Director: Victor Maddox
 Investigator: John Byrd

Reps: 3
 Spray vol: 25 gal/ac

Plots: 10 by 30 feet
 Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	DPX-MAT28	50 %		SG	1.88	oz ai/a	A	2.253 g/mx	101	203	302
	HERB	Telar	75 %AW/W		WG	0.75	oz ai/a	A	0.5991 g/mx			
	ADJ	NIS	100 %		SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	DPX-MAT28	50 %		SG	1.48	oz ai/a	A	1.773 g/mx	102	204	301
	HERB	Telar	75 %AW/W		WG	0.59	oz ai/a	A	0.4713 g/mx			
	ADJ	NIS	100 %		SL	0.25	% v/v	A	4.999 ml/mx			
	HERB	Nicosulfuron	75 %		WG	0.84	oz ai/a	B	0.671 g/mx			
	HERB	Escort	60 %AW/W		WG	0.225	oz ai/a	B	0.2247 g/mx			
	HERB	Accord XRT	5.4 LB/GAL		SL	6.0	fl oz/a	B	3.75 ml/mx			
	ADJ	NIS	100 %		SL	0.25	% v/v	B	4.999 ml/mx			
3	HERB	Perspective			SG	5.0	oz wt/a	A	2.996 g/mx	103	201	303
	ADJ	NIS	100 %		SL	0.25	% v/v	A	4.999 ml/mx			
4	CHK	Untreated Check						A		104	202	304

Chart 35. Bahiagrass (*Paspalum notatum*) damage (control) at 1 and 3 MAT.

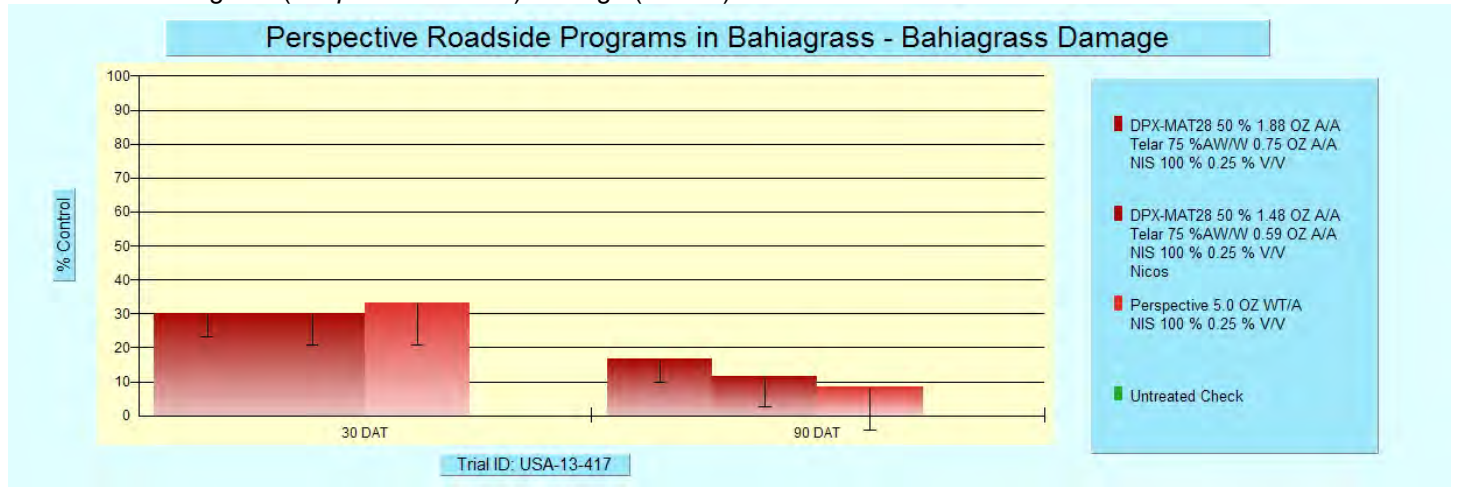
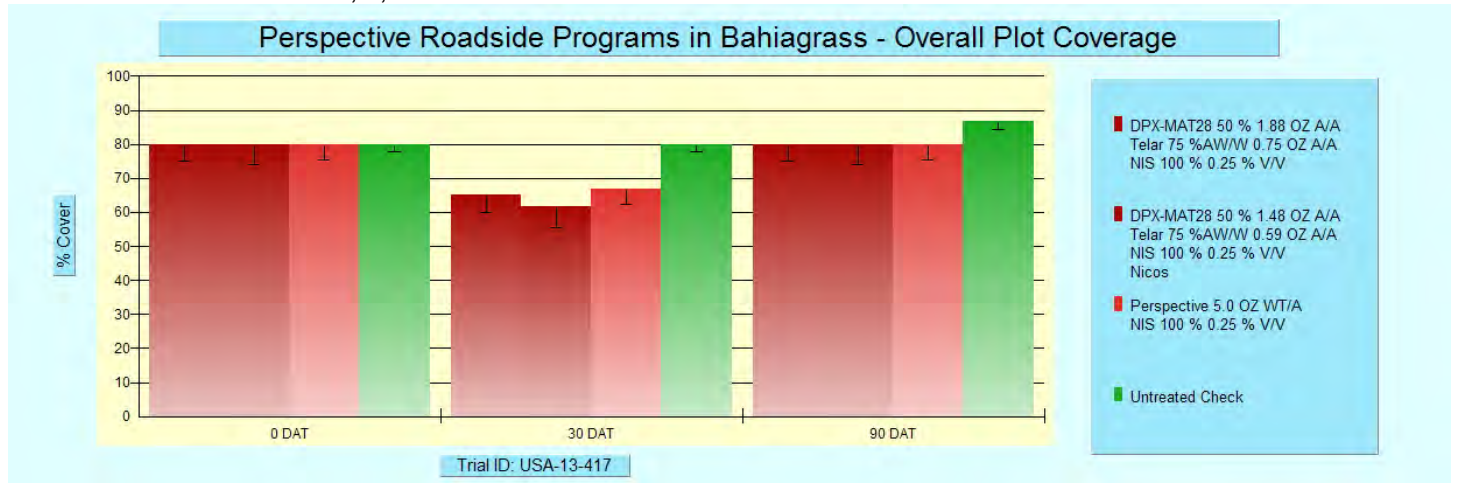


Chart 36. Overall cover at 0, 1, and 3 MAT.



Perspective Roadside Programs in Bahiagrass (Continued)

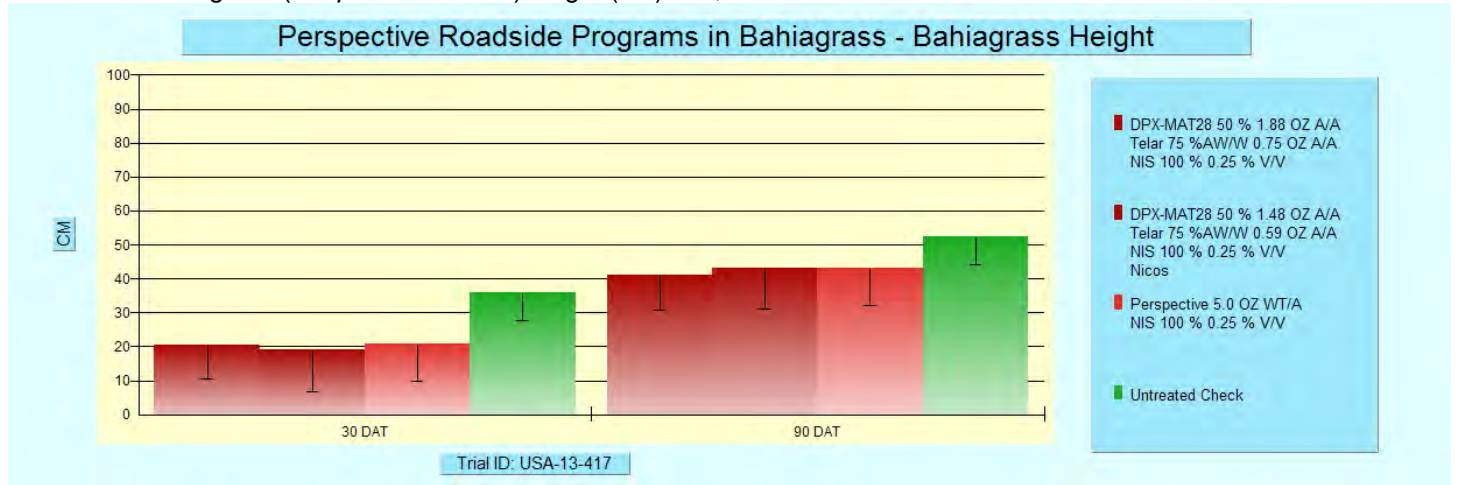
Protocol ID: USA-13-417
 Location: Wiggins, MS

Trial ID: USA-13-417
 Study Director: Victor Maddox
 Investigator: John Byrd

Crop Code	BBCH Scale	Crop Name	Rating Date	Rating Data Type	Rating Unit	PPaspalum n> 5/22/14 GROUND %	Canadian go> 5/22/14 GROUND %	PPaspalum n> 4/19/13 GROUND %	Overall 4/19/13 GROUND %	Canadian go> 4/19/13 GROUND %	Large hop c> 4/19/13 GROUND %	Vaseygrass 4/19/13 GROUND %
Trt No.	Treatment Name	Rate	Unit									
1	2	3	4	5	6	7						
1	DPX-MAT28	1.88	oz ai/a	68.3	a	3.3	b	63.3	80.0	10.0	20.0	6.0
	Telar	0.75	oz ai/a									
	NIS	0.25	% v/v									
2	DPX-MAT28	1.48	oz ai/a	70.0	a	1.7	b	65.0	80.0	10.0	20.0	5.7
	Telar	0.59	oz ai/a									
	NIS	0.25	% v/v									
	Nicosulfuron	0.84	oz ai/a									
	Escort	0.225	oz ai/a									
	Accord XRT	6.0	fl oz/a									
	NIS	0.25	% v/v									
3	Perspective	5.0	oz wt/a	70.0	a	1.7	b	66.7	80.0	10.0	20.0	5.7
	NIS	0.25	% v/v									
4	Untreated Check			70.0	a	63.3	a	66.7	80.0	10.0	21.7	6.0
	LSD (P=Various)			2.88		8.32		5.52	0.00	0.00	2.88	2.73
	Standard Deviation			1.44		4.17		2.76	0.00	0.00	1.44	1.36
	CV			2.07		23.81		4.23	0.0	0.0	7.07	23.39
	Bartlett's X2			0.0		1.474		0.051	0.0	0.0	0.0	0.554
	P(Bartlett's X2)			.		0.688		0.997	.	.	.	0.907
	Mean Sep. Test			LSD.05		LSD.05						
	Replicate F			1.000		0.360		13.364	0.000	0.000	1.000	1.657
	Replicate Prob(F)			0.4219		0.7118		0.0062	1.0000	1.0000	0.4219	0.2674
	Treatment F			1.000		161.440		1.000	0.000	0.000	1.000	0.060
	Treatment Prob(F)			0.4547		0.0001		0.4547	1.0000	1.0000	0.4547	0.9792

Means followed by same letter do not differ significantly.

Chart 37. Bahiagrass (*Paspalum notatum*) height (cm) at 1, and 3 MAT.



Perspective Roadside Programs in Bahiagrass (Continued)

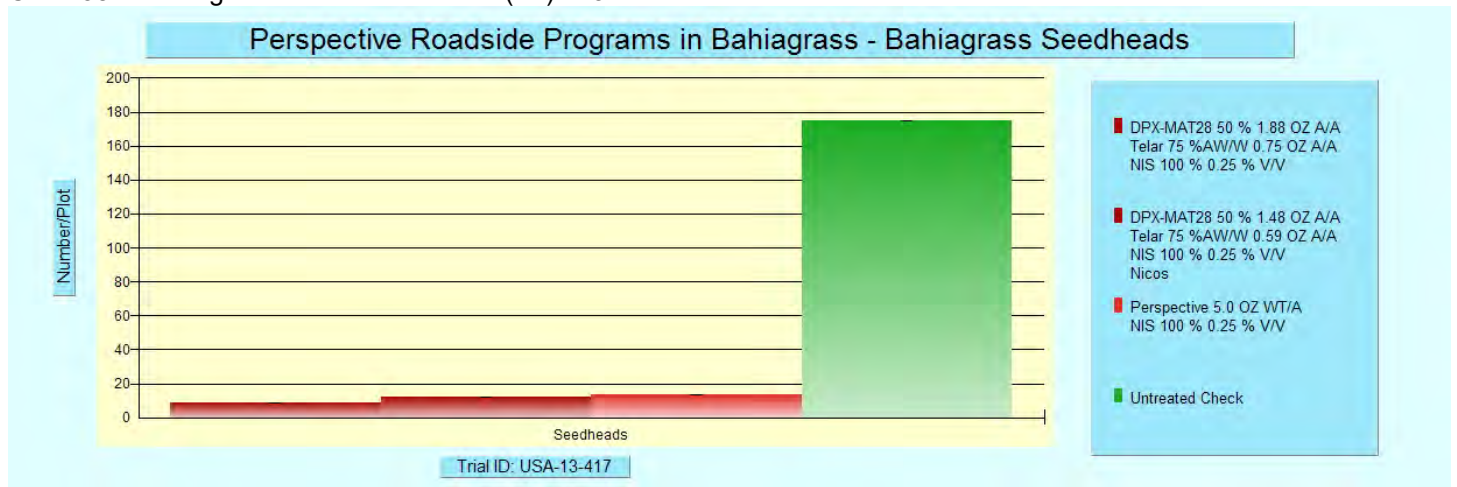
Protocol ID: USA-13-417
 Location: Wiggins, MS

Trial ID: USA-13-417
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name		FESAR			Canadian go>	Large hop c>				
Crop Code		BGRM								
BBCH Scale		Tall fescue	Paspalum no>	Overall			Paspalum no>	Overall		
Crop Name		4/19/13	5/20/13	5/20/13	5/20/13	5/20/13	5/20/13	7/18/13		
Rating Date		GROUND	CONTRO	GROUND	CONTRO	CONTRO	HEIGHT	GROUND		
Rating Data Type		%	%	%	%	%	CM	%		
Rating Unit										
Trt No.	Treatment Name	Rate	Unit	8	9	10	11	12	13	14
1	DPX-MAT28	1.88	oz ai/a	11.7	30.0 a	65.0 b	36.7 a	100.0 a	20.7 b	80.0 b
	Telar	0.75	oz ai/a							
	NIS	0.25	% v/v							
2	DPX-MAT28	1.48	oz ai/a	13.3	30.0 a	61.7 b	36.7 a	100.0 a	19.0 b	80.0 b
	Telar	0.59	oz ai/a							
	NIS	0.25	% v/v							
	Nicosulfuron	0.84	oz ai/a							
	Escort	0.225	oz ai/a							
	Accord XRT	6.0	fl oz/a							
	NIS	0.25	% v/v							
3	Perspective	5.0	oz wt/a	13.3	33.3 a	66.7 b	40.0 a	100.0 a	21.0 b	80.0 b
	NIS	0.25	% v/v							
4	Untreated Check			13.3	0.0	80.0 a	0.0	0.0	36.0 a	86.7 a
	LSD (P=Various)			2.88	7.56	8.81	15.11	0.00	3.69	2.88
	Standard Deviation			1.44	3.33	4.41	6.67	0.00	1.85	1.44
	CV			11.17	10.71	6.45	17.65	0.0	7.65	1.77
	Bartlett's X2			0.221	0.0	0.824	0.756	0.0	1.379	0.0
	P(Bartlett's X2)			0.974	.	0.662	0.685	.	0.502	.
	Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F			73.000	1.000	0.429	1.750	0.000	0.024	1.000
	Replicate Prob(F)			0.0001	0.4444	0.6699	0.2844	1.0000	0.9760	0.4219
	Treatment F			1.000	1.000	10.000	0.250	0.000	55.317	16.000
	Treatment Prob(F)			0.4547	0.4444	0.0095	0.7901	1.0000	0.0001	0.0029

Means followed by same letter do not differ significantly.

Chart 38. Bahiagrass seedhead number (m²) at 3 MAT.



Perspective Roadside Programs in Bahiagrass (Continued)

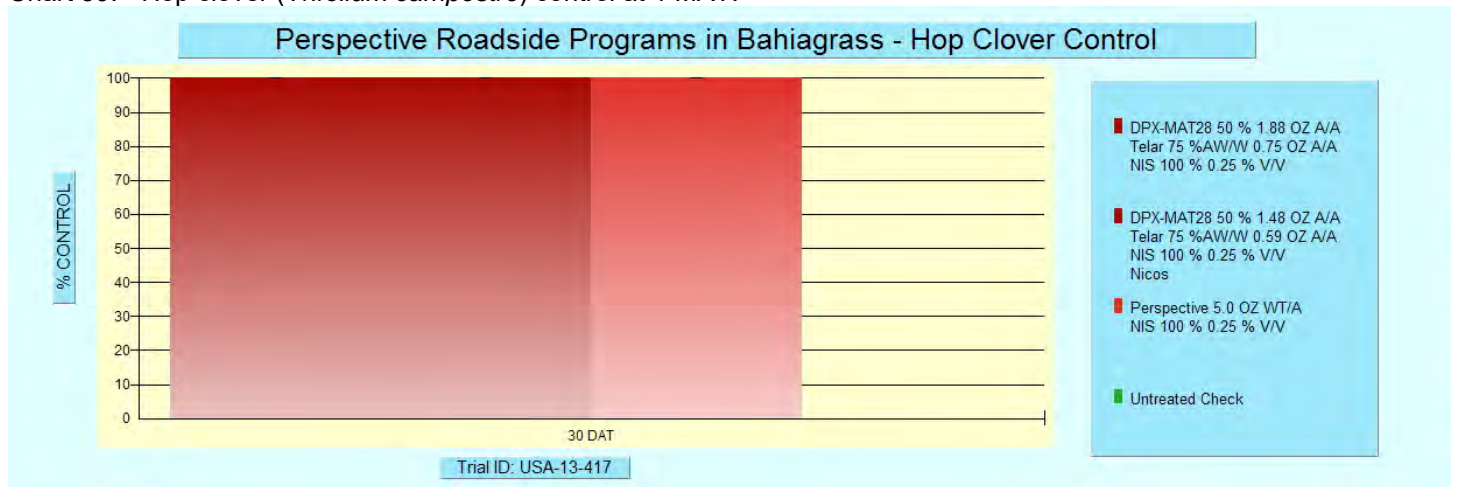
Protocol ID: USA-13-417
 Location: Wiggins, MS

Trial ID: USA-13-417
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name			Canadian go>		Vaseygrass				
Crop Code				Paspalum no>		Paspalum no>	Paspalum no>	Paspalum no>	Paspalum no>
BBCH Scale				7/18/13	7/18/13	7/18/13	7/18/13	7/18/13	8/7/13
Crop Name				CONTRO	CONTRO	CONTRO	HEIGHT	COPLPA	HEIGHT
Rating Date				%	%	%	CM	NUMBER	CM
Rating Data Type									
Rating Unit									
Trt No.	Treatment Name	Rate Unit	15	16	17	18	19	20	21
1	DPX-MAT28 Telar NIS	1.88 oz ai/a 0.75 oz ai/a 0.25 % v/v	80.0 a	16.7 a	16.7 a	41.0 a	9.0 b	46.3 a	43.7 bc
2	DPX-MAT28 Telar NIS Nicosulfuron Escort Accord XRT NIS	1.48 oz ai/a 0.59 oz ai/a 0.25 % v/v 0.84 oz ai/a 0.225 oz ai/a 6.0 fl oz/a 0.25 % v/v	76.7 a	11.7 a	13.3 a	43.3 a	12.3 b	45.3 ab	34.0 c
3	Perspective NIS	5.0 oz wt/a 0.25 % v/v	90.0 a	8.3 a	6.7 a	43.3 a	13.3 b	42.0 b	46.3 ab
4	Untreated Check		0.0	0.0	0.0	52.3 a	175.0 a	49.3 a	55.3 a
LSD (P=Various)			23.89	9.99	30.22	9.32	26.89	4.32	10.79
Standard Deviation			10.54	4.41	13.33	4.66	13.46	2.16	5.40
CV			12.82	36.08	109.09	10.36	25.68	4.72	12.04
Bartlett's X2			0.038	1.207	1.44	4.593	12.223	1.28	4.046
P(Bartlett's X2)			0.845	0.547	0.487	0.204	0.007*	0.734	0.257
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			0.100	0.571	0.250	0.908	0.768	0.214	0.260
Replicate Prob(F)			0.9070	0.6049	0.7901	0.4524	0.5049	0.8130	0.7791
Treatment F			1.300	2.714	0.438	3.464	110.632	5.875	7.935
Treatment Prob(F)			0.3673	0.1800	0.6732	0.0913	0.0001	0.0322	0.0164

Means followed by same letter do not differ significantly.

Chart 39. Hop clover (*Trifolium campestre*) control at 1 MAT.



Perspective Roadside Programs in Bahiagrass (Continued)

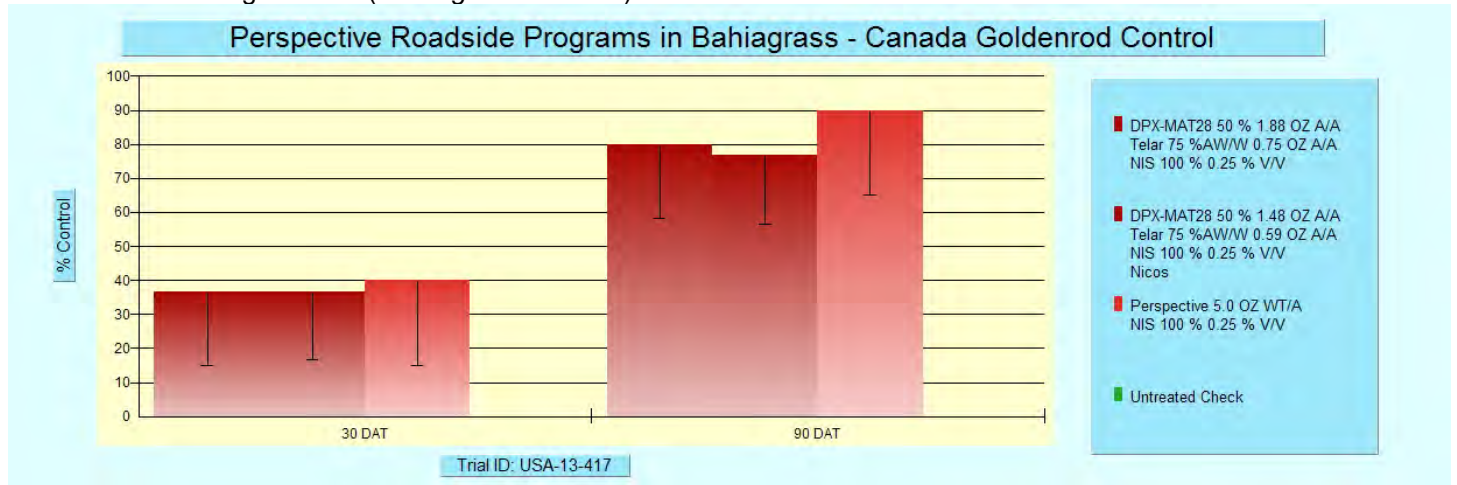
Protocol ID: USA-13-417
 Location: Wiggins, MS

Trial ID: USA-13-417
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name			Paspalum no>		Vaseygrass		Paspalum no>		Paspalum no>		Overall	
Crop Code			9/6/13		9/6/13		9/6/13		10/15/13		10/15/13	
BBCH Scale			CONTRO		GROUND		COPLPA		HEIGHT		GROUND	
Crop Name			%		%		NUMBER		CM		%	
Rating Date												
Rating Data Type												
Rating Unit												
Trt	Treatment	Rate	22	23	24	25	26	27	28			
No.	Name	Unit										
1	DPX-MAT28	1.88 oz ai/a	10.0 b	78.3 b	10.0 a	7.3 a	42.0 a	3.3 a	88.3 a			
	Telar	0.75 oz ai/a										
	NIS	0.25 % v/v										
2	DPX-MAT28	1.48 oz ai/a	25.0 a	68.3 c	16.7 a	0.0 a	41.7 a	0.0 a	88.3 a			
	Telar	0.59 oz ai/a										
	NIS	0.25 % v/v										
	Nicosulfuron	0.84 oz ai/a										
	Escort	0.225 oz ai/a										
	Accord XRT	6.0 fl oz/a										
	NIS	0.25 % v/v										
3	Perspective	5.0 oz wt/a	6.7 b	80.0 ab	5.0 a	7.3 a	43.3 a	0.0 a	88.3 a			
	NIS	0.25 % v/v										
4	Untreated Check		0.0	85.0 a	0.0	76.7 a	49.3 a	0.0	88.3 a			
LSD (P=Various)			9.99	6.66	19.99	65.98	7.06	7.56	0.00			
Standard Deviation			4.41	3.33	8.82	33.02	3.53	3.33	0.00			
CV			31.75	4.28	83.55	144.63	8.01	300.0	0.0			
Bartlett's X2			0.6	1.536	0.989	14.085	1.104	0.0	0.0			
P(Bartlett's X2)			0.741	0.464	0.61	0.001*	0.776	.	1.00			
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05			
Replicate F			1.000	5.250	0.036	0.834	0.929	1.000	0.000			
Replicate Prob(F)			0.4444	0.0481	0.9652	0.4793	0.4453	0.4444	1.0000			
Treatment F			14.714	13.188	1.321	3.576	3.071	1.000	0.000			
Treatment Prob(F)			0.0143	0.0047	0.3626	0.0862	0.1124	0.4444	1.0000			

Means followed by same letter do not differ significantly.

Chart 40. Canada goldenrod (*Solidago canadensis*) control at 1 and 3 MAT.



Perspective Roadside Programs in Bahiagrass (Continued)

Protocol ID: USA-13-417
Location: Wiggins, MS

Trial ID: USA-13-417
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name			Vaseygrass	Canadian go>
Crop Code				
BBCH Scale				
Crop Name				
Rating Date			10/15/13	10/15/13
Rating Data Type			CONTRO	CONTRO
Rating Unit			%	%
Trt No.	Treatment Name	Rate	Unit	
			29	30
1	DPX-MAT28	1.88	oz ai/a	
	Telar	0.75	oz ai/a	
	NIS	0.25	% v/v	
2	DPX-MAT28	1.48	oz ai/a	
	Telar	0.59	oz ai/a	
	NIS	0.25	% v/v	
	Nicosulfuron	0.84	oz ai/a	
	Escort	0.225	oz ai/a	
	Accord XRT	6.0	fl oz/a	
	NIS	0.25	% v/v	
3	Perspective	5.0	oz wt/a	
	NIS	0.25	% v/v	
4	Untreated Check			
			0.0	0.0
	LSD (P=Various)		15.80	0.00
	Standard Deviation		6.97	0.00
	CV		179.28	0.0
	Bartlett's X2		2.45	0.0
	P(Bartlett's X2)		0.118	.
	Mean Sep. Test		LSD.05	LSD.05
	Replicate F		0.400	0.000
	Replicate Prob(F)		0.6944	1.0000
	Treatment F		1.086	0.000
	Treatment Prob(F)		0.4201	1.0000

Means followed by same letter do not differ significantly.

Perspective Roadside Programs in Bermudagrass

Protocol ID: USA-13-416

Trial ID: USA-13-416

Location: West Point, MS

Study Director: Victor Maddox

Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox

Investigator: John Byrd

Trial Location

City: West Point

Trial Status: Completed

State/Prov.: MS

Directions:

South of West Point, MS on east side of Highway 45 just south of the Tibbee Creek Bridge.

Conducted Under GLP:

Official Trial Code: _____

Conducted Under GEP: X

Other Trial Code: _____

**Perspective Roadside Programs in Bermudagrass
Results and Conclusions**

This study looks at Perspective (DPX-MAT28 plus Telar) applied alone as one application or with a follow-up application of nicosulfuron and Escort plus Accord XRT for managing weeds in bermudagrass (*Cynodon dactylon*) roadside turf. It will be referred to as 'Trt 2' in the following text of this section. 'MAT' refers to the first application.

Bermudagrass and Tall Fescue Responses

Overall cover was unchanged at 1 MAT (Chart 41). No significant damage to bermudagrass or tall fescue (*Schedonorus arundinaceus*) (Chart 42) was observed at 1 MAT. In addition, no significant reduction in bermudagrass height was observed (Chart 43), but a significant reduction in tall fescue height compared to the untreated was observed (Chart 44). This trend was similar at 3 MAT, except there was no significant difference in tall fescue height. A similar response was observed following application 2, but tall fescue damage was significant at 1 month after the second application. However, there were no significant differences for bermudagrass or tall fescue damage or height at 2 and 3 months after the second application. At 12 MAT, tall fescue cover was lower in Trt 2 plots, but the difference was not significant.

Buckhorn Plantain Response

All three herbicide treatments showed good control of buckhorn plantain (*Plantago lanceolata*) at 3 MAT (Chart 45). The second application did assist with buckhorn plantain control. At 3 months after the second treatment, 100 percent control of buckhorn plantain was observed in Trt 2, significantly better control than single application treatments at 73.3 and 83.3 percent, respectively.

Overall Conclusions

Both bermudagrass and tall fescue seemed to have tolerance to Perspective in this study. However, the second application damaged tall fescue which was still somewhat evident into the following year. Although the first application showed some control, the second application was effective in completing the control of buckhorn plantain.

Perspective Roadside Programs in Bermudagrass (Continued)

Protocol ID: USA-13-416

Trial ID: USA-13-416

Location: West Point, MS

Study Director: Victor Maddox

Investigator: John Byrd

Crop Description

Crop 1: CYNDA *Cynodon dactylon*

Bermuda grass

Site and Design

Plot Width, Unit: 10 FT

Plot Length, Unit: 30 FT

Replications: 3

Study Design: Randomized Complete Block

Application Description

	A	B
Application Date:	4/18/13	8/8/13
Time of Day:	1 PM	1 PM
Application Method:	SPRAY	SPRAY
Application Timing:	PREPOS	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	V. Maddox	V. Maddox
Air Temperature, Unit:	81 F	92 F
% Relative Humidity:	46	60
Wind Velocity, Unit:	3 MPH	2 MPH
Wind Direction:	S	S
Dew Presence (Y/N):	N	N
Soil Temperature, Unit:	65 F	
Soil Moisture:	Adequate	ADEQUATE
% Cloud Cover:	80	50

Application Equipment

	A	B
Appl. Equipment:	Backpack	Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Band Width, Unit:		
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters

Perspective Roadside Programs in Bermudagrass (Continued)

Protocol ID: USA-13-416
 Location: West Point, MS

Trial ID: USA-13-416
 Study Director: Victor Maddox
 Investigator: John Byrd

Reps: 3 Plots: 10 by 30 feet
 Spray vol: 25 gal/ac Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	DPX-MAT28	50 %		SG	1.88	oz ai/a	A	2.253 g/mx	101	203	302
	HERB	Telar	75 %AW/W		WG	0.75	oz ai/a	A	0.5991 g/mx			
	ADJ	NIS	100 %		SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	DPX-MAT28	50 %		SG	1.48	oz ai/a	A	1.773 g/mx	102	204	301
	HERB	Telar	75 %AW/W		WG	0.59	oz ai/a	A	0.4713 g/mx			
	ADJ	NIS	100 %		SL	0.25	% v/v	A	4.999 ml/mx			
	HERB	Nicosulfuron	75 %		WG	0.84	oz ai/a	B	0.671 g/mx			
	HERB	Escort	60 %AW/W		WG	0.225	oz ai/a	B	0.2247 g/mx			
	HERB	Accord XRT	5.4 LB/GAL		SL	6.0	fl oz/a	B	3.75 ml/mx			
	ADJ	NIS	100 %		SL	0.25	% v/v	B	4.999 ml/mx			
3	HERB	Perspective			SG	5.0	oz wt/a	A	2.996 g/mx	103	201	303
	ADJ	NIS	100 %		SL	0.25	% v/v	A	4.999 ml/mx			
4	CHK	Untreated Check						A		104	202	304

Chart 41. Overall cover through 3 MAT.

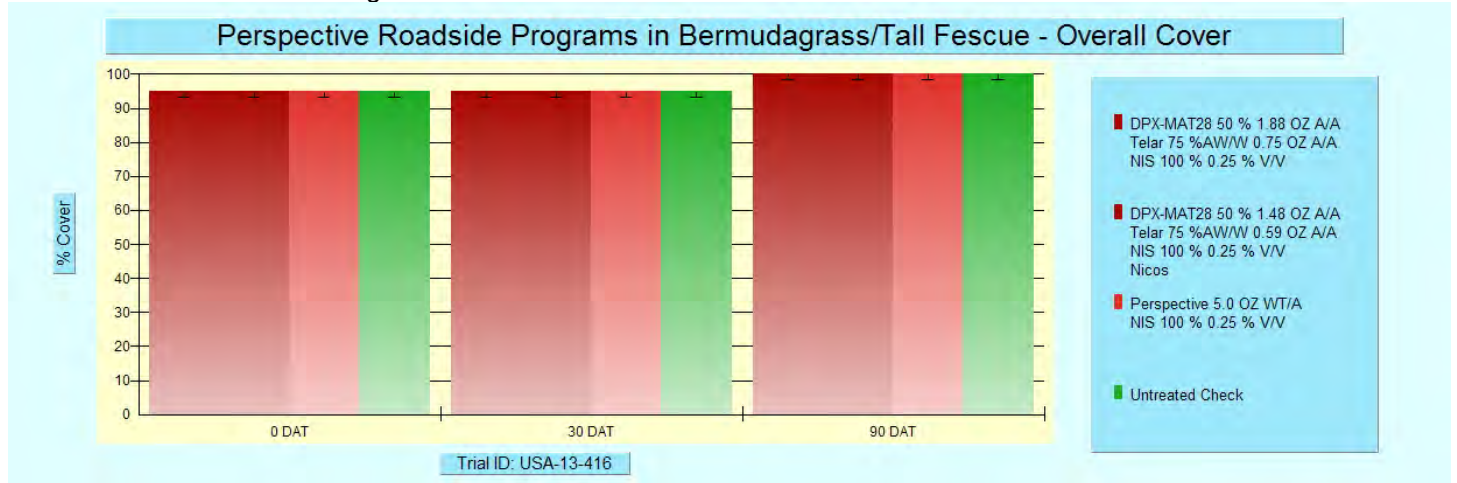
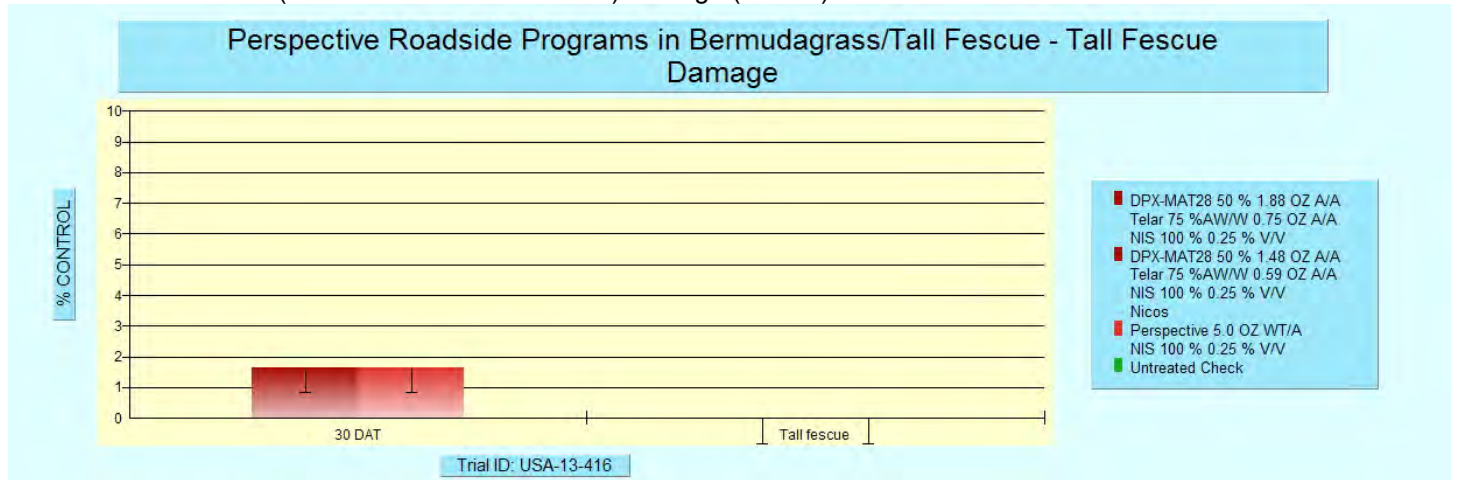


Chart 42. Tall fescue (*Schedonorus arundinaceus*) damage (control) at 1 MAT.



Perspective Roadside Programs in Bermudagrass (Continued)

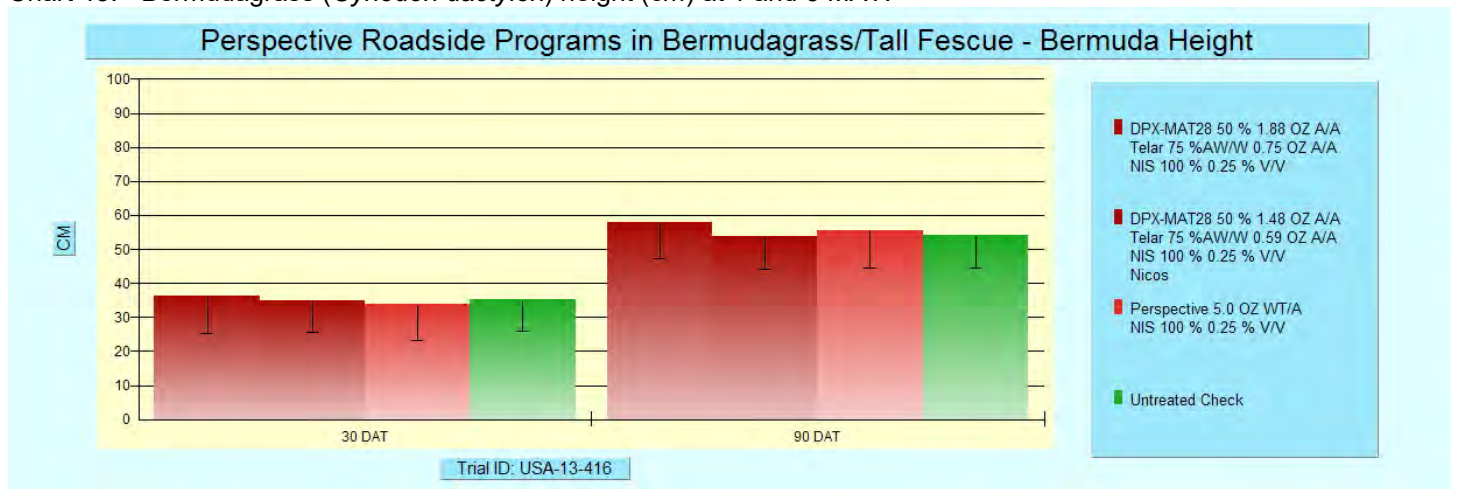
Protocol ID: USA-13-416
 Location: West Point, MS

Trial ID: USA-13-416
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name			FESAR BGRM	Lolium mult> LOLMU BGRM	Hairyfruit > LOLMU BGRM	Buckhorn pl>	Downy brome	CYNDA BGRM	Overall	
Crop Code			Tall fescue					Bermuda gra>	5/17/13	
BBCH Scale			4/18/13	4/18/13	4/18/13	4/18/13	4/18/13	4/18/13	GROUND	
Crop Name			GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	
Rating Date			%	%	%	%	%	%	%	
Rating Data Type										
Rating Unit										
Trt	Treatment	Rate	1	2	3	4	5	6	7	8
No.	Name	Unit								
1	DPX-MAT28	1.88 oz ai/a	95.0	36.7	10.0	6.7	6.7	13.3	63.3	95.0 a
	Telar	0.75 oz ai/a								
	NIS	0.25 % v/v								
2	DPX-MAT28	1.48 oz ai/a	95.0	35.0	10.0	6.0	6.7	13.3	65.0	95.0 a
	Telar	0.59 oz ai/a								
	NIS	0.25 % v/v								
	Nicosulfuron	0.84 oz ai/a								
	Escort	0.225 oz ai/a								
	Accord XRT	6.0 fl oz/a								
	NIS	0.25 % v/v								
3	Perspective	5.0 oz wt/a	95.0	36.7	10.0	6.7	4.7	13.3	63.3	95.0 a
	NIS	0.25 % v/v								
4	Untreated Check		95.0	35.0	10.0	8.3	2.7	11.7	65.0	95.0 a
LSD (P=Various)			0.00	12.01	0.00	2.92	5.77	2.88	12.01	0.00
Standard Deviation			0.00	6.01	0.00	1.46	2.89	1.44	6.01	0.00
CV			0.0	16.77	0.0	21.14	55.87	11.17	9.37	0.0
Bartlett's X2			0.0	0.561	0.0	0.561	1.159	0.0	0.561	0.0
P(Bartlett's X2)			.	0.905	.	0.905	0.763	1.00	0.905	.
Mean Sep. Test										LSD.05
Replicate F			0.000	14.077	0.000	10.091	2.080	13.000	14.077	0.000
Replicate Prob(F)			1.0000	0.0054	1.0000	0.0120	0.2060	0.0066	0.0054	1.0000
Treatment F			0.000	0.077	0.000	1.390	1.320	1.000	0.077	0.000
Treatment Prob(F)			1.0000	0.9702	1.0000	0.3338	0.3522	0.4547	0.9702	1.0000

Means followed by same letter do not differ significantly.

Chart 43. Bermudagrass (*Cynodon dactylon*) height (cm) at 1 and 3 MAT.



Perspective Roadside Programs in Bermudagrass (Continued)

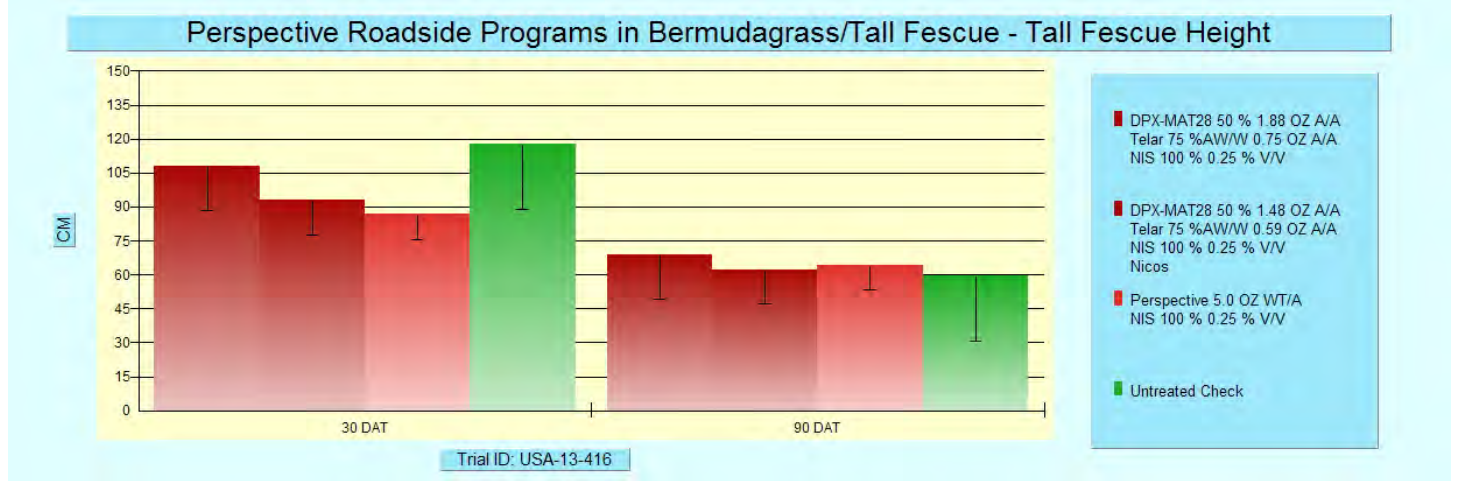
Protocol ID: USA-13-416
 Location: West Point, MS

Trial ID: USA-13-416
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name			CYNDA	FESAR	FESAR	CYNDA		CYNDA	FESAR	
Crop Code			BGRM	BGRM	BGRM	BGRM		BGRM	BGRM	
BBCH Scale			Bermuda gra>	Tall fescue	Tall fescue	Bermuda gra>	Overall	Bermuda gra>	Tall fescue	
Crop Name			5/17/13	5/17/13	5/17/13	5/17/13	7/17/13	7/17/13	7/17/13	
Rating Date			HEIGHT	HEIGHT	CONTRO	CONTRO	GROUND	HEIGHT	HEIGHT	
Rating Data Type			CM	CM	%	%	%	CM	CM	
Rating Unit										
Trt	Treatment	Rate	Rate							
No.	Name		Unit	9	10	11	12	13	14	15
1	DPX-MAT28	1.88	oz ai/a	36.3 a	94.0 b	0.0 a	0.0 a	100.0 a	58.0 a	69.0 a
	Telar	0.75	oz ai/a							
	NIS	0.25	% v/v							
2	DPX-MAT28	1.48	oz ai/a	35.0 a	93.0 b	1.7 a	0.0 a	100.0 a	53.7 a	62.3 a
	Telar	0.59	oz ai/a							
	NIS	0.25	% v/v							
	Nicosulfuron	0.84	oz ai/a							
	Escort	0.225	oz ai/a							
	Accord XRT	6.0	fl oz/a							
	NIS	0.25	% v/v							
3	Perspective	5.0	oz wt/a	34.0 a	94.3 b	1.7 a	0.0 a	100.0 a	55.3 a	64.3 a
	NIS	0.25	% v/v							
4	Untreated Check			35.3 a	124.3 a	0.0	0.0	100.0 a	54.0 a	59.7 a
LSD (P=Various)				11.65	18.28	5.97	0.00	0.00	11.80	15.15
Standard Deviation				5.83	9.15	2.64	0.00	0.00	5.91	7.58
CV				16.59	9.02	237.17	0.0	0.0	10.69	11.88
Bartlett's X2				1.403	6.447	0.0	0.0	0.0	8.626	0.783
P(Bartlett's X2)				0.705	0.092	1.00	.	.	0.035*	0.853
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				0.987	0.198	0.400	0.000	0.000	0.803	0.619
Replicate Prob(F)				0.4260	0.8254	0.6944	1.0000	1.0000	0.4911	0.5696
Treatment F				0.082	8.378	0.400	0.000	0.000	0.334	0.810
Treatment Prob(F)				0.9676	0.0145	0.6944	1.0000	1.0000	0.8020	0.5330

Means followed by same letter do not differ significantly.

Chart 44. Tall Fescue (*Schedonorus arundinaceus*) height (cm) at 1 and 3 MAT.



Perspective Roadside Programs in Bermudagrass (Continued)

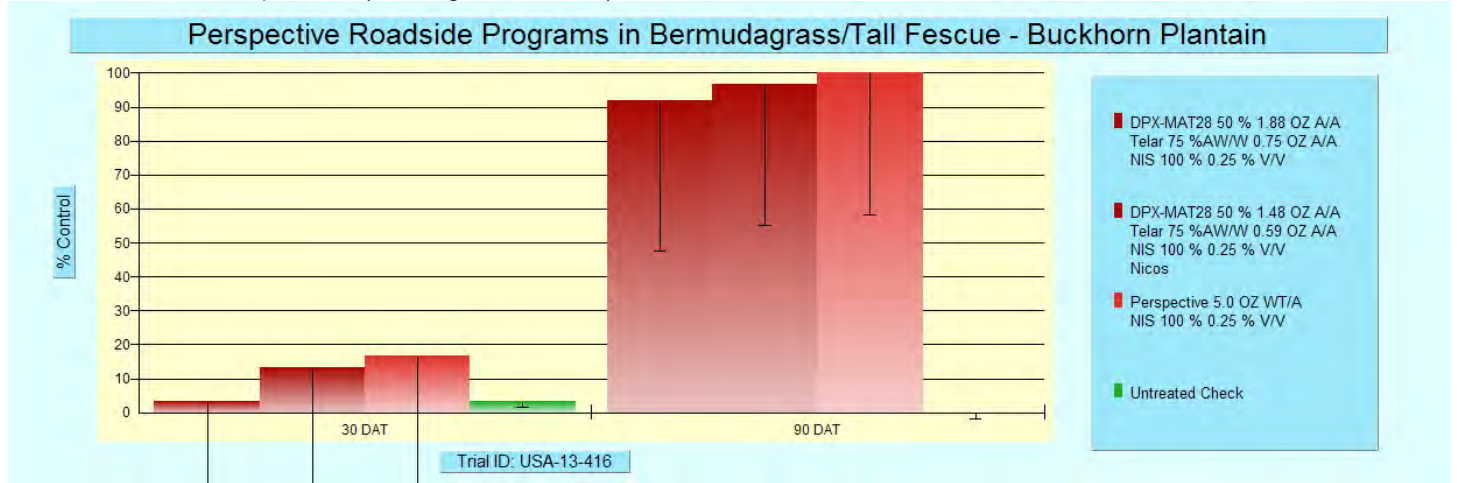
Protocol ID: USA-13-416
 Location: West Point, MS

Trial ID: USA-13-416
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name			Buckhorn pl>							
Crop Code			Overall		CYNDA	FESAR	FESAR	CYNDA	Overall	CYNDA
BBCH Scale			9/6/13		Bermuda gra>	Tall fescue	Tall fescue	Bermuda gra>	Bermuda gra>	
Crop Name			GROUND		9/6/13	9/6/13	9/6/13	9/6/13	10/14/13	
Rating Date			%		HEIGHT	HEIGHT	CONTRO	CONTRO	HEIGHT	
Rating Data Type			%		CM	CM	%	%	CM	
Rating Unit			%		CM	CM	%	%	CM	
Trt	Treatment	Rate	16	17	18	19	20	21	22	23
1	DPX-MAT28	1.88 oz ai/a	91.7 a	100.0 a	41.3 a	58.3 a	0.0 b	0.0 b	100.0 a	37.0 a
	Telar	0.75 oz ai/a								
	NIS	0.25 % v/v								
2	DPX-MAT28	1.48 oz ai/a	96.7 a	100.0 a	46.3 a	46.7 b	30.0 a	23.3 a	100.0 a	37.0 a
	Telar	0.59 oz ai/a								
	NIS	0.25 % v/v								
	Nicosulfuron	0.84 oz ai/a								
	Escort	0.225 oz ai/a								
	Accord XRT	6.0 fl oz/a								
	NIS	0.25 % v/v								
3	Perspective	5.0 oz wt/a	100.0 a	100.0 a	43.3 a	61.7 a	0.0 b	0.0 b	100.0 a	39.7 a
	NIS	0.25 % v/v								
4	Untreated Check		0.0	100.0 a	43.3 a	59.3 a	0.0	0.0	100.0 a	39.0 a
LSD (P=Various)			7.56	0.00	11.35	9.20	13.09	7.56	0.00	12.83
Standard Deviation			3.33	0.00	5.68	4.60	5.77	3.33	0.00	6.42
CV			3.47	0.0	13.03	8.15	57.74	42.86	0.0	16.83
Bartlett's X2			0.824	0.0	8.31	1.12	0.0	0.0	0.0	0.951
P(Bartlett's X2)			0.364	.	0.04*	0.772	.	.	.	0.813
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			1.750	0.000	0.979	0.507	1.000	1.000	0.000	0.960
Replicate Prob(F)			0.2844	1.0000	0.4285	0.6259	0.4444	0.4444	1.0000	0.4349
Treatment F			4.750	0.000	0.395	6.359	27.000	49.000	0.000	0.137
Treatment Prob(F)			0.0878	1.0000	0.7613	0.0271	0.0048	0.0015	1.0000	0.9341

Means followed by same letter do not differ significantly.

Chart 44. Buckhorn plantain (*Plantago lanceolata*) control at 1 and 3 MAT.



Perspective Roadside Programs in Bermudagrass (Continued)

Protocol ID: USA-13-416

Trial ID: USA-13-416

Location: West Point, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		FESAR BGRM	CYNDA BGRM	FESAR BGRM	Buckhorn pl>	FESAR BGRM		
Crop Code		Tall fescue	Bermuda gra>	Tall fescue		Tall fescue		
BBCH Scale		10/14/13	11/6/13	11/6/13	11/6/13	5/13/14		
Crop Name		HEIGHT	HEIGHT	HEIGHT	CONTRO	GROUND		
Rating Date		CM	CM	CM	%	%		
Rating Data Type								
Rating Unit								
Trt No.	Treatment Name	Rate	Unit					
				24	25	26		
				27	28			
1	DPX-MAT28	1.88	oz ai/a	56.0 a	34.0 a	43.7 a	73.3 c	28.3 a
	Telar	0.75	oz ai/a					
	NIS	0.25	% v/v					
2	DPX-MAT28	1.48	oz ai/a	51.3 a	33.7 a	45.7 a	100.0 a	11.7 a
	Telar	0.59	oz ai/a					
	NIS	0.25	% v/v					
	Nicosulfuron	0.84	oz ai/a					
	Escort	0.225	oz ai/a					
	Accord XRT	6.0	fl oz/a					
	NIS	0.25	% v/v					
3	Perspective	5.0	oz wt/a	54.3 a	33.0 a	50.3 a	83.3 b	26.7 a
	NIS	0.25	% v/v					
4	Untreated Check			61.0 a	33.0 a	55.3 a	0.0	16.7
	LSD (P=Various)			16.94	7.59	10.42	7.56	39.98
	Standard Deviation			8.48	3.80	5.21	3.33	17.64
	CV			15.23	11.36	10.7	3.9	79.37
	Bartlett's X2			3.389	2.752	8.184	0.0	2.458
	P(Bartlett's X2)			0.335	0.432	0.042*	1.00	0.293
	Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F			1.657	1.601	2.013	4.000	2.179
	Replicate Prob(F)			0.2673	0.2772	0.2143	0.1111	0.2291
	Treatment F			0.683	0.052	2.986	49.000	0.813
	Treatment Prob(F)			0.5939	0.9829	0.1179	0.0015	0.5057

Means followed by same letter do not differ significantly.

Protocol ID: VUSA2013V10336PRO1
 Location: Carroll County

Trial ID: VUSA2013V10336PRO1
 Study Director: Victor Maddox
 Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Trial Location

City: Carrolton **Trial Status:** Completed
State/Prov.: MS
N -Latitude of LL Corner °: 33.49214 **W -Longitude of LL Corner °:** 89.86646

Conducted Under GLP: **Official Trial Code:** _____
Conducted Under GEP: X **Other Trial Code:** _____

Results and Discussion

Bahiagrass and Bermudagrass Responses

At 1 through 3 weeks after treatment (WAT), significant bahiagrass discoloration was observed. Only prodiamine alone showed no discoloration, which indicates that prodiamine in the herbicide mixes likely did not cause the discoloration. Since bahiagrass (*Paspalum notatum*) was going into dormancy following the 3 WAT rating, no further discoloration ratings were taken. Bahiagrass discoloration was not observed the following spring. No discoloration to bermudagrass (*Cynodon dactylon*) was observed.

Bahiagrass and bermudagrass cover at 6 MAT was higher in herbicide treated compared to untreated plots, although differences were not significant. Overall cover was lower, however compared to the untreated. This is a reflection of increased weed cover in the untreated plots. This trend remained through 7 months after treatment (MAT), except bermudagrass cover which did not improve in the plots receiving the higher (10 oz/A) rate of Piper. Still, cover differences were not significant for bahiagrass and bermudagrass and this trend remained through 8 MAT.

Cool-season Annual Grass Weed Response

All cool-season annual grasses (*Bromus tectorum*, *Lolium multiflorum*, and *Vulpia myuros*) were controlled at 46 days after treatment (DAT) as reflected by 0 percent cover compared to the untreated check (Chart 45). At 5 MAT, overall weed cover ranged from 1 to 36.7 percent, with cover in treatments containing Piper or Payload having significantly less cover compared to prodiamine alone or the untreated. At 6 MAT, *Bromus* and *Vulpia* were at 0 percent cover for all herbicide treatments, except prodiamine alone which had significantly more *Bromus* cover (21.7%) compared to all other herbicide treatments (Chart 46). Herbicide treatments were not as effective on ryegrass but all were significantly better than the untreated (Chart 47). Treatments with Piper or Payload plus prodiamine were best, ranging from 0 to 0.3 percent cover. This trend remained through 7 MAT.

Warm-season Annual Grass Weed Response

Going into summer at 8 MAT, knotroot foxtail (*Setaria parviflora*; Syn. *S. geniculata*) cover was significantly higher in treatments receiving Piper along compared to all treatments receiving prodiamine and the untreated (Chart 48). A similar, but not as pronounced, trend was observed with southern crabgrass (*Digitaria ciliaris*) (Chart 49). This trend was still significant for knotroot foxtail 280 days after the late fall herbicide application. Based upon this data, it is possible that prodiamine has a long-residual effect upon the pre-emergence of these grasses, particularly knotroot foxtail. It should be noted that foxtail, which can be rhizomatous perennial, was not observed in the fall, so no rhizomes were likely present.

Overall Conclusions

Piper or Payload treatments with prodiamine improve annual cool-season grass weed control compared to prodiamine alone. The product seems safe on bermudagrass under the conditions of this study. However, discoloration on bahiagrass may be expected when applied before frost in the fall. This discoloration was not retained into spring greenup. When applied late, the long-residual of prodiamine appears to influence early summer pre-emergence of knotroot foxtail at least up to 280 days and southern crabgrass 241 days after the initial application. This may have applications in other areas where these weeds are problematic, such as range and pasture for knotroot foxtail.

Valent Roadside Weed Control - Fall Applied (Continued)

Protocol ID: VUSA2013V10336PRO1
Location: Carroll County

Trial ID: VUSA2013V10336PRO1
Study Director: Victor Maddox
Investigator: John Byrd

Site and Design

Plot Width, Unit: 10 FT **Site Type:** _____
Plot Length, Unit: 30 FT **Tillage Type:** _____
Replications: 3 **Study Design:** Randomized Complete Block

Trial Initiation Comments:

Applied on Friday and it rained the next day. Should have had adequate rainfall for pre-emerge to reach soil.

Application Description

	A
Application Date:	10/25/13
Time of Day:	12:30 PM
Application Method:	SPRAY
Application Timing:	POSPRE
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	54 F
% Relative Humidity:	50
Wind Velocity, Unit:	4 MPH
Wind Direction:	E
Dew Presence (Y/N):	N
Soil Moisture:	Adequate
% Cloud Cover:	0

Application Equipment

	A
Appl. Equipment:	Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	2 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Treatment Application Comment

Date	By	Notes
10/30/14	VLM	<i>Digitaria ciliaris</i> was not in ARM list. However, the species in this study was <i>D. ciliaris</i> (southern crabgrass), not <i>D. sanguinalis</i> (large crabgrass). <i>D. ciliaris</i> was once considered a variant of <i>D. sanguinalis</i> and may be why it is not on the list.

Valent Roadside Weed Control - Fall Applied (Continued)

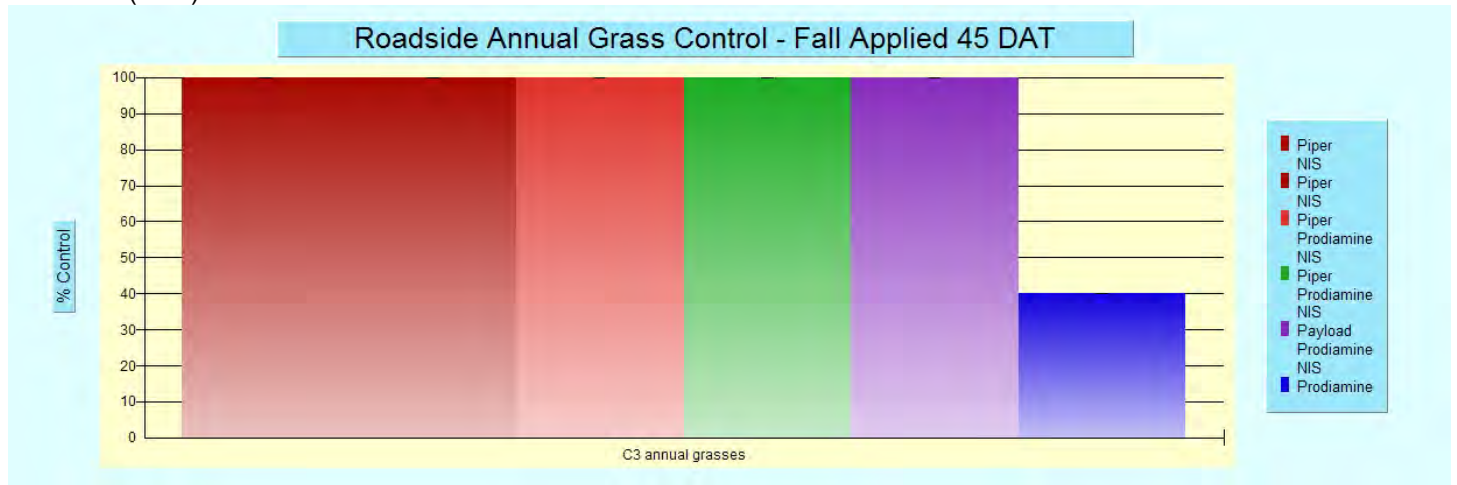
Protocol ID: VUSA2013V10336PRO1
 Location: Carroll County

Trial ID: VUSA2013V10336PRO1
 Study Director: Victor Maddox
 Investigator: John Byrd

Reps: 3 Plots: 10 by 30 feet
 Spray vol: 25 gal/ac Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	CHK	Untreated Check								101	203	303
2	HERB ADJ	Piper NIS	76 %	W/W	WG SL	10 oz	wt/a	A	5.991 g/mx	102	206	302
			100 %			0.25 %	v/v	A	4.999 ml/mx			
3	HERB ADJ	Piper NIS	76 %	W/W	WG SL	8 oz	wt/a	A	4.793 g/mx	103	201	307
			100 %			0.25 %	v/v	A	4.999 ml/mx			
4	HERB ADJ	Piper Prodiamine NIS	76 %	W/W	WG SL	10 oz	wt/a	A	5.991 g/mx	104	202	306
			65 %	W/W	WG SL	2.3 lb/a		A	22.05 g/mx			
			100 %			0.25 %	v/v	A	4.999 ml/mx			
5	HERB ADJ	Piper Prodiamine NIS	76 %	W/W	WG SL	8 oz	wt/a	A	4.793 g/mx	105	207	304
			65 %	W/W	WG SL	2.3 lb/a		A	22.05 g/mx			
			100 %			0.25 %	v/v	A	4.999 ml/mx			
6	HERB ADJ	Payload Prodiamine NIS	51 %	W/W	WG SL	10 oz	wt/a	A	5.991 g/mx	106	205	301
			65 %	W/W	WG SL	2.3 lb/a		A	22.05 g/mx			
			100 %			0.25 %	v/v	A	4.999 ml/mx			
7	HERB	Prodiamine	65 %	W/W	WG	2.3 lb/a		A	22.05 g/mx	107	204	305

Chart 45. Annual cool-season grass (*Bromus tectorum*, *Lolium multiflorum*, and *Vulpia myuros*) control 45 days after treatment (DAT).



Valent Roadside Weed Control - Fall Applied (Continued)

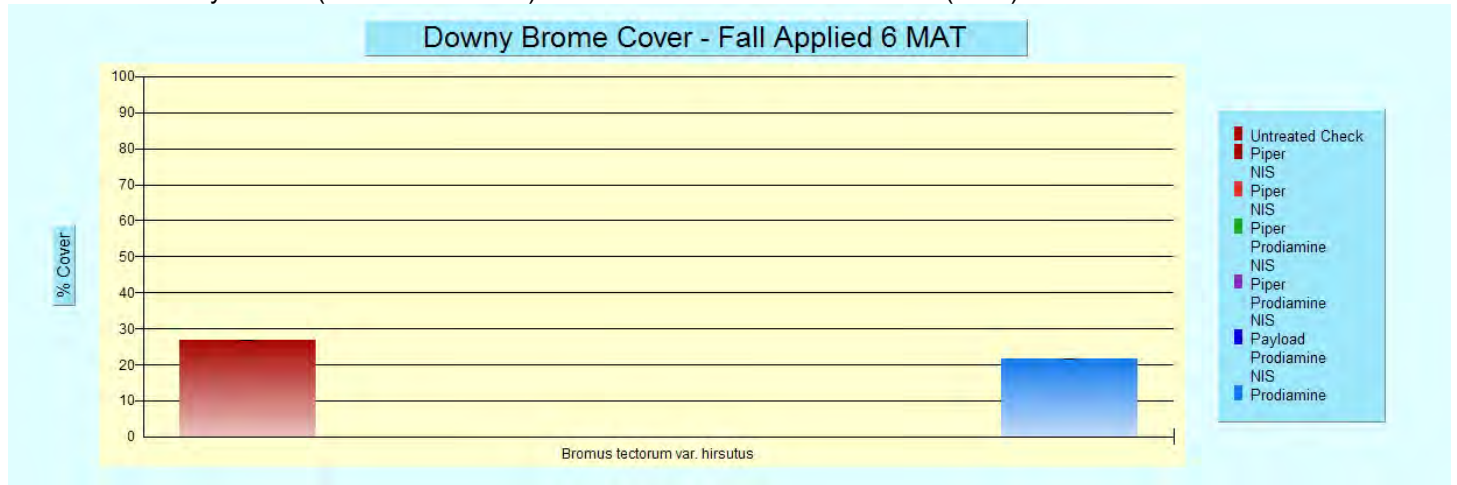
Protocol ID: VUSA2013V10336PRO1
 Location: Carroll County

Trial ID: VUSA2013V10336PRO1
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Type			W Weed	W Weed	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code			C3 annual g>	C3 annual g>	Weed cover	Bromus tect>	Bromus tect>	VLPYMY	LOLMU
Pest Name								Rattail fes>	Italian rye>
Crop Code	PASNO	PASNO							
BBCH Scale	BGRM	BGRM							
Crop Name	Bahiagrass	Bahiagrass							
Rating Date	11/1/13	11/15/13	12/10/13	3/25/14	4/24/14	4/24/14	4/24/14	4/24/14	4/24/14
Rating Data Type	COLOR	COLOR	GROUND	CONTRO	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Unit	1-9	1-9	%	%	%	%	%	%	%
Days After First/Last Applic.	7 7	21 21	46 46	151 151	181 181	181 181	181 181	181 181	181 181
Trt-Eval Interval	7 DA-A	7 DA-A	46 DA-A	46 DA-A	46 DA-A	181 DA-A	181 DA-A	181 DA-A	181 DA-A
ARM Action Codes	L05	L05	L05	L05	L05	L05	L05	L05	L05
Trt Treatment	Rate								
No. Name	Rate Unit	1	2	3	4	5	6	7	8
1 Untreated Check		6.7 a	4.7 a	18.3 a	0.0 c	66.7 a	26.7 a	6.7 a	35.0 a
2 Piper	10 oz wt/a	5.0 b	2.0 b	0.0 c	100.0 a	10.0 cd	0.0 c	0.0 b	4.7 bc
	0.25 % v/v								
3 Piper	8 oz wt/a	5.0 b	2.0 b	0.0 c	100.0 a	15.0 c	0.0 c	0.0 b	8.3 bc
	0.25 % v/v								
4 Piper	10 oz wt/a	5.0 b	2.0 b	0.0 c	100.0 a	1.0 d	0.0 c	0.0 b	0.3 c
	2.3 lb/a								
	0.25 % v/v								
5 Piper	8 oz wt/a	5.0 b	2.0 b	0.0 c	100.0 a	2.3 d	0.0 c	0.0 b	0.3 c
	2.3 lb/a								
	0.25 % v/v								
6 Payload	10 oz wt/a	5.0 b	2.0 b	0.0 c	100.0 a	3.7 d	0.0 c	0.0 b	0.0 c
	2.3 lb/a								
	0.25 % v/v								
7 Prodiamine	2.3 lb/a	6.7 a	5.0 a	10.0 b	40.0 b	36.7 b	21.7 b	0.0 b	11.7 b
LSD (P=.05)		0.57	0.39	3.88	6.72	10.97	2.86	1.94	10.53
Standard Deviation		0.32	0.22	2.18	3.78	6.17	1.61	1.09	5.92
CV		5.87	7.77	53.91	4.9	31.9	23.26	114.56	68.69
Bartlett's X2		0.0	0.0	0.556	0.0	5.148	0.0	0.0	19.58
P(Bartlett's X2)		1.00	.	0.456	.	0.398	1.00	.	0.001*
Replicate F		0.462	1.000	1.000	1.000	0.212	0.462	1.000	0.124
Replicate Prob(F)		0.6410	0.3966	0.3966	0.3966	0.8123	0.6410	0.3966	0.8848
Treatment F		19.231	121.000	33.750	348.000	46.223	164.154	16.000	13.301
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not differ significantly (P=.05, LSD).

Chart 46. Downy Brome (*Bromus tectorum*) cover at 6 months after treatment (MAT).



Valent Roadside Weed Control - Fall Applied (Continued)

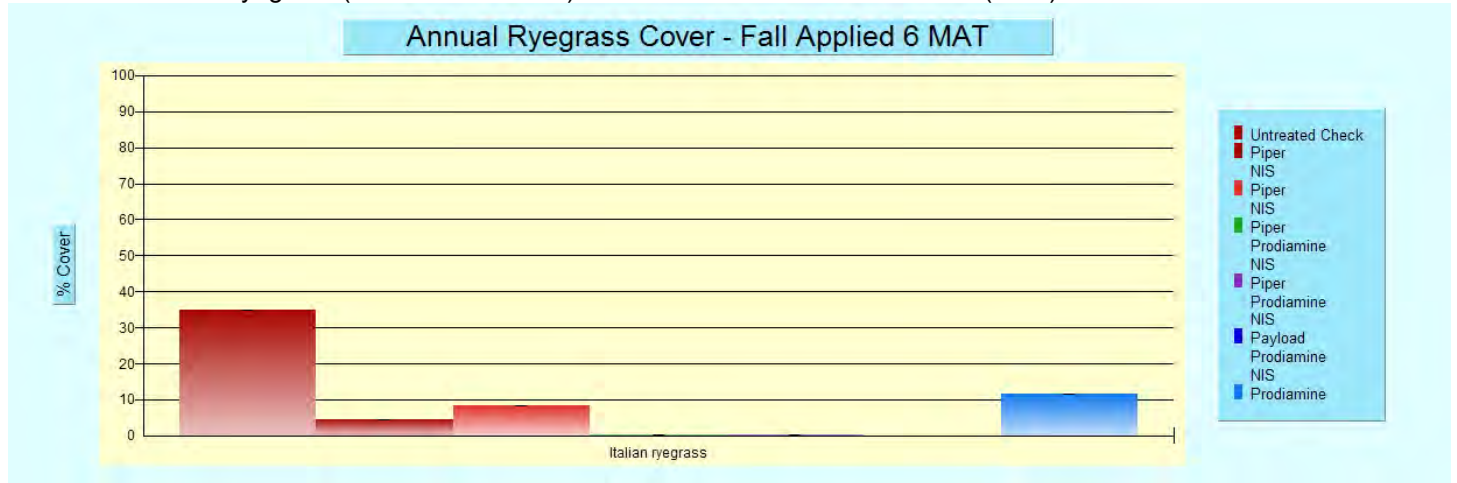
Protocol ID: VUSA2013V10336PRO1
 Location: Carroll County

Trial ID: VUSA2013V10336PRO1
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Type	PASNO		CYNDA		Overall		PASNO		W Weed	W Weed	W Weed	CYNDA		
Pest Code	BGRM		BGRM		BGRM		BGRM		Bromus tect>	VLP MY	LOL MU	BGRM		
Pest Name	Bahigrass		Bermuda gra>		Bahigrass		Bahigrass			Rattail fes>	Italian rye>	Bermuda gra>		
Crop Code	4/24/14		4/24/14		4/24/14		5/23/14		5/23/14	5/23/14	5/23/14	5/23/14		
BBCH Scale	GROUND		GROUND		GROUND		GROUND		GROUND	GROUND	GROUND	GROUND		
Crop Name	%		%		%		%		%	%	%	%		
Rating Date	181	181	181	181	181	181	210	210	210	210	210	210	210	
Rating Data Type	7 DA-A		7 DA-A		181 DA-A		7 DA-A		181 DA-A	181 DA-A	181 DA-A	7 DA-A		
Rating Unit	L05		L05		L05		L05		L05	L05	L05	L05		
Days After First/Last Applic.														
Trt-Eval Interval														
ARM Action Codes														
Trt Treatment	Rate		Rate		Rate		Rate					Rate		
No. Name	Rate	Unit	Rate	Unit	Rate	Unit	Rate	Unit				Rate	Unit	
1 Untreated Check	8.3	a	6.7	a	75.0	a	43.3	a	53.3	a	16.7	a	23.3	a
2 Piper NIS	10 oz wt/a 0.25 % v/v		26.7	a	8.3	a	41.7	bcd	70.0	a	1.7	c	0.0	b
3 Piper NIS	8 oz wt/a 0.25 % v/v		23.3	a	16.7	a	50.0	bc	50.0	a	0.7	c	0.0	b
4 Piper Prodiamine NIS	10 oz wt/a 2.3 lb/a 0.25 % v/v		23.3	a	16.7	a	40.0	cd	50.0	a	0.0	c	0.0	b
5 Piper Prodiamine NIS	8 oz wt/a 2.3 lb/a 0.25 % v/v		20.0	a	16.7	a	36.7	cd	43.3	a	0.0	c	0.0	b
6 Payload Prodiamine NIS	10 oz wt/a 2.3 lb/a 0.25 % v/v		16.7	a	10.0	a	31.7	d	60.0	a	0.3	c	0.0	b
7 Prodiamine	2.3 lb/a		15.0	a	13.3	a	55.0	b	60.0	a	33.3	b	0.0	b
LSD (P=.05)	14.99		11.70		14.07		43.78		12.11		3.88		7.00	
Standard Deviation	8.43		6.58		7.91		24.61		6.81		2.18		3.93	
CV	44.25		52.12		16.77		45.73		53.34		91.65		44.64	
Bartlett's X2	5.322		6.205		3.308		6.607		22.473		0.0		14.732	
P(Bartlett's X2)	0.503		0.401		0.769		0.359		0.001*		.		0.012*	
Replicate F	1.274		2.670		3.600		0.220		1.977		1.000		0.594	
Replicate Prob(F)	0.3150		0.1099		0.0596		0.8055		0.1811		0.3966		0.5675	
Treatment F	1.637		1.275		10.210		0.485		30.414		25.000		15.335	
Treatment Prob(F)	0.2200		0.3380		0.0004		0.8075		0.0001		0.0001		0.0001	

Means followed by same letter do not differ significantly (P=.05, LSD).

Chart 47. Annual ryegrass (*Lolium multiflorum*) cover at 6 months after treatment (MAT).



Valent Roadside Weed Control - Fall Applied (Continued)

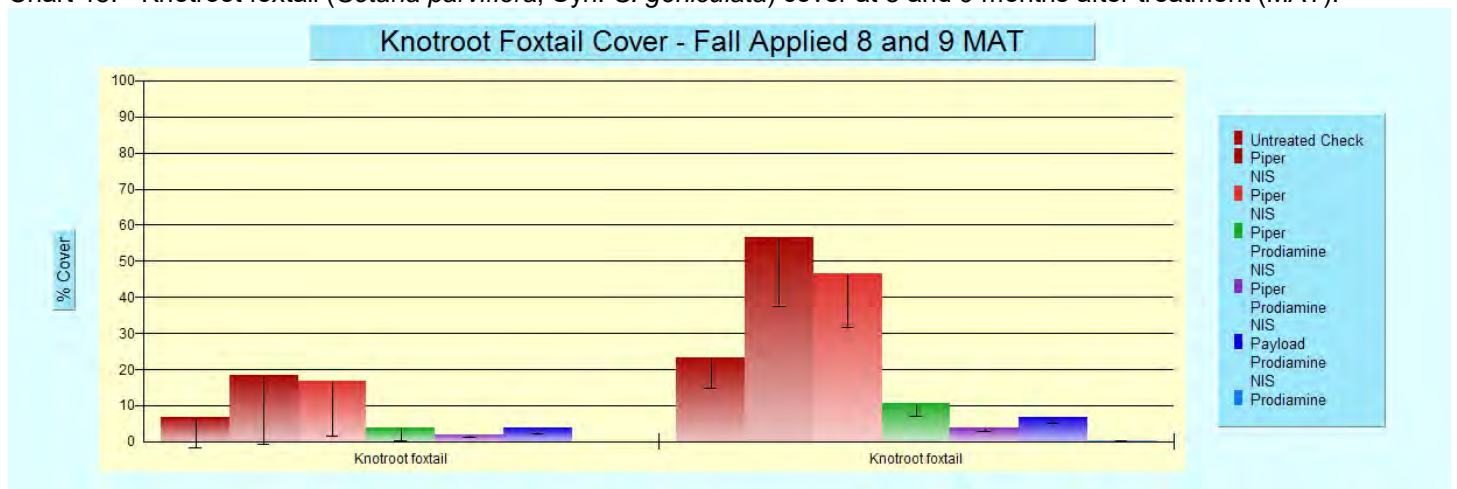
Protocol ID: VUSA2013V10336PRO1
 Location: Carroll County

Trial ID: VUSA2013V10336PRO1
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Type				W Weed SETGE Knotroot fo>	W Weed DIGSA Large crabg>	W Weed SETGE Knotroot fo>
Pest Code						
Pest Name						
Crop Code	PASNO	CYNDA				
BBCH Scale	BGRM	BGRM				
Crop Name	Bahiagrass	Bermuda gra>				
Rating Date	6/23/14	6/23/14		6/23/14	6/23/14	8/1/14
Rating Data Type	GROUND	GROUND		GROUND	GROUND	GROUND
Rating Unit	%	%		%	%	%
Days After First/Last Applic.	241 241	241 241		241 241	241 241	280 280
Trt-Eval Interval	7 DA-A	7 DA-A		241 DA-A	241 DA-A	241 DA-A
ARM Action Codes	L05	L05		L05	L05	L05
Trt Treatment	Rate					
No. Name	Rate Unit	17	18	19	20	21
1 Untreated Check		68.3 a	23.3 a	6.7 b	4.0 b	23.3 b
2 Piper NIS	10 oz wt/a 0.25 % v/v	70.0 a	15.0 a	18.3 a	13.3 a	56.7 a
3 Piper NIS	8 oz wt/a 0.25 % v/v	60.0 a	26.7 a	16.7 a	6.7 b	46.7 a
4 Piper Prodiamine NIS	10 oz wt/a 2.3 lb/a 0.25 % v/v	60.0 a	36.7 a	3.7 bc	0.0 c	10.7 bc
5 Piper Prodiamine NIS	8 oz wt/a 2.3 lb/a 0.25 % v/v	60.0 a	40.0 a	2.0 bc	0.7 c	3.7 bc
6 Payload Prodiamine NIS	10 oz wt/a 2.3 lb/a 0.25 % v/v	68.3 a	33.3 a	3.7 bc	0.0 c	6.7 bc
7 Prodiamine	2.3 lb/a	71.7 a	30.0 a	0.0 c	0.0 c	0.3 c
LSD (P=.05)		29.84	15.37	5.67	2.98	21.76
Standard Deviation		16.77	8.64	3.19	1.67	12.23
CV		25.62	29.49	43.75	47.5	57.85
Bartlett's X2		14.832	2.45	3.802	4.034	18.278
P(Bartlett's X2)		0.022*	0.874	0.578	0.258	0.006*
Replicate F		0.220	1.484	0.267	1.139	0.820
Replicate Prob(F)		0.8057	0.2655	0.7700	0.3525	0.4636
Treatment F		0.293	2.899	15.634	27.082	9.946
Treatment Prob(F)		0.9287	0.0551	0.0001	0.0001	0.0005

Means followed by same letter do not differ significantly (P=.05, LSD).

Chart 48. Knotroot foxtail (*Setaria parviflora*; Syn. *S. geniculata*) cover at 8 and 9 months after treatment (MAT).

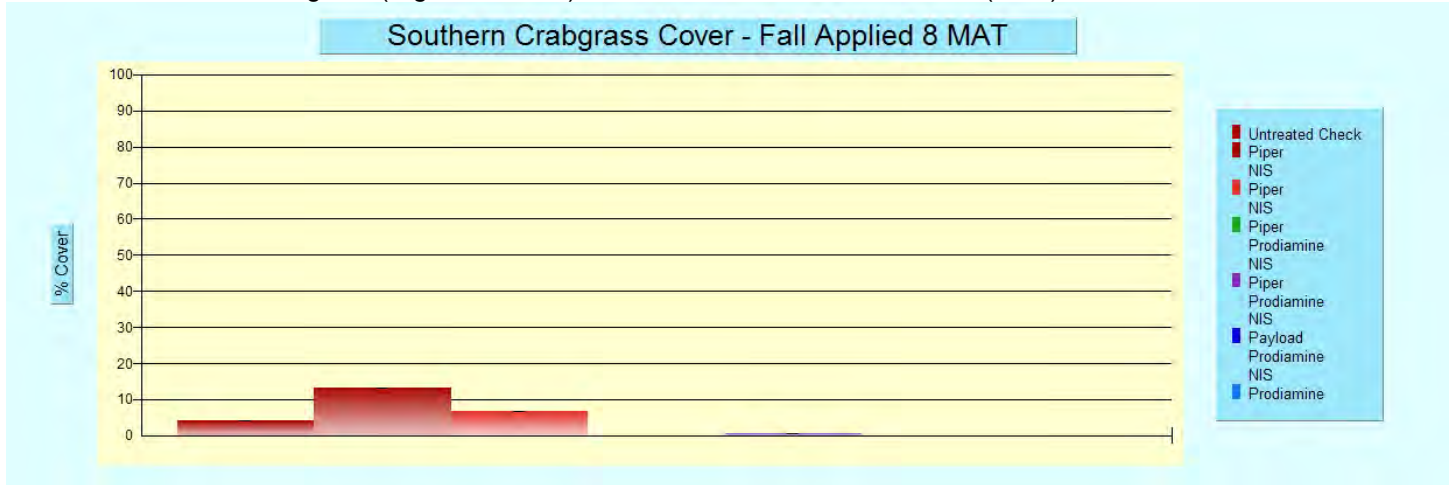


Valent Roadside Weed Control - Fall Applied (Continued)

Protocol ID: VUSA2013V10336PRO1
Location: Carroll County

Trial ID: VUSA2013V10336PRO1
Study Director: Victor Maddox
Investigator: John Byrd

Chart 49. Southern crabgrass (*Digitaria ciliaris*) cover at 8 months after treatment (MAT).



**Efficacy of triclopyr HL formulation versus triclopyr TEA for woody plant
Control - Box Elder (*Acer negundo*)**

Protocol ID: NA14L1A003Trial ID: NA14L1A003
 Location: Starkville, MSStudy Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Trial Location

City: Starkville**Trial Status:** ___Completed___
State/Prov.: MS**Trial Reliability:** _____
Directions:
 Along ditch in middle of MSU Plant Science Research Center on north side of Hwy 182.

Conducted Under GLP: _ **Official Trial Code:** _____
Conducted Under GEP: X **Other Trial Code:** _____

Results and Discussion

Box Elder Response

Controls were not as effective on box elder (*Acer negundo*) compared to Chinese privet (*Ligustrum sinensis*) (see following study) and southern dewberry (*Rubus trivialis*). By 60 DAT, regrowth occurred on both box elder and Chinese privet (see following study) in all plots where they occurred. Hence, control (burndown) decreased, but only slightly on box elder (Chart 50). There were significant differences between HL or TEA formations in box elder control.

Giant Goldenrod and Southern Dewberry Response

Giant goldenrod (*Solidago gigantea*) was the dominant herbaceous perennial at the time of initiation ranging from 31.7 to 46.7 percent cover on average. Treatments were effective on giant goldenrod and southern dewberry (*Rubus trivialis*) through 90 DAT. There were no significant differences in control between the HL and TEA triclopyr formulations.

Site and Design

Plot Width, Unit: 10 FT **Site Type:** _____
Plot Length, Unit: 30 FT **Tillage Type:** _____
Replications: 3 **Study Design:** Randomized Complete Block

Application Description

	A
Application Date:	4/24/14
Time of Day:	1:30 PM
Application Method:	SPRAY
Application Timing:	NCPOPE
Application Placement:	FOLIAR
Applied By:	V Maddox
Air Temperature, Unit:	84 F
% Relative Humidity:	60
Wind Velocity, Unit:	5 MPH
Wind Direction:	S
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	80

**Efficacy of triclopyr HL formulation versus triclopyr TEA for woody plant
Control - Box Elder (*Acer negundo*) (Continued)**

Protocol ID: NA14L1A003
Location: Starkville, MS

Trial ID: NA14L1A003
Study Director: Victor Maddox
Investigator: John Byrd

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	2 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Triclopyr HL	4	LBAE/GAL	SL	24	oz ae/a	A	30.0 ml/mx	101	203	301
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	Garlon 3A	3	LBAE/GAL	SC	24	oz ae/a	A	40.0 ml/mx	102	201	302
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	CHK	Untreated Check								103	202	303

**Efficacy of triclopyr HL formulation versus triclopyr TEA for woody plant
Control - Box Elder (*Acer negundo*) (Continued)**

Protocol ID: NA14L1A003

Trial ID: NA14L1A003

Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

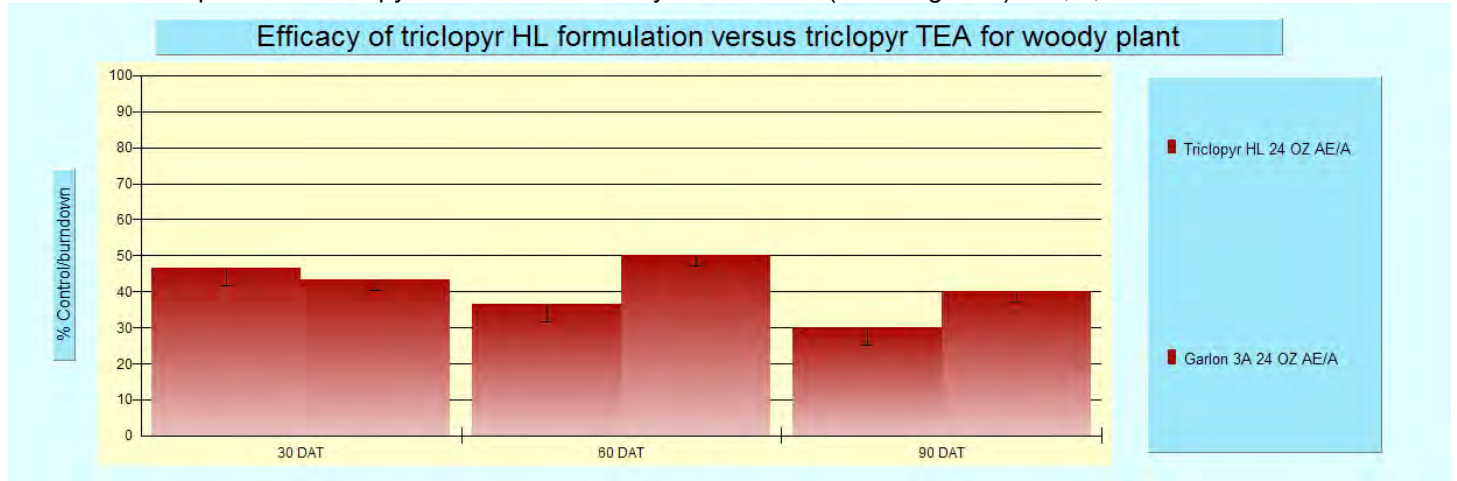
Pest Name	Box elder	Solidago gi>	Southern de>	Box elder	Solidago gi>	Southern de>	Box elder	Solidago gi>	
Rating Date	4/24/14	4/24/14	4/24/14	5/22/14	5/22/14	5/22/14	6/19/14	6/19/14	
Rating Data Type	GROUND	GROUND	GROUND	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	
Rating Unit	%	%	%	%	%	%	%	%	
Trt Treatment	Rate	1	2	3	4	5	6	7	8
No. Name	Rate Unit								
1 Triclopyr HL NIS	24 oz ae/a 0.25 % v/v	40.0	43.3	16.7	46.7 a	56.7 a	93.3 a	36.7 a	76.7 a
2 Garlon 3A NIS	24 oz ae/a 0.25 % v/v	43.3	46.7	20.0	43.3 a	50.0 a	93.3 a	50.0 a	70.0 a
3 Untreated Check		50.0	31.7	20.0	0.0	0.0	0.0	0.0	0.0
LSD (P=Various)		25.62	37.78	19.99	14.34	14.34	0.00	79.86	57.37
Standard Deviation		11.30	16.67	8.82	4.08	4.08	0.00	22.73	16.33
CV		25.43	41.1	46.69	9.07	7.65	0.0	52.45	22.27
Bartlett's X2		0.049	0.911	1.922	0.0	0.511	0.0	3.113	0.101
P(Bartlett's X2)		0.976	0.634	0.383	1.00	0.475	1.00	0.078	0.75
Mean Sep. Test					LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		0.609	1.330	3.571	3.000	7.000	0.000	0.419	3.250
Replicate Prob(F)		0.5878	0.3607	0.1289	0.2500	0.1250	1.0000	0.7045	0.2353
Treatment F		0.609	0.670	0.143	1.000	4.000	0.000	0.516	0.250
Treatment Prob(F)		0.5878	0.5611	0.8711	0.4226	0.1835	1.0000	0.5471	0.6667

Means followed by same letter do not differ significantly.

Pest Name	Southern de>	Box elder	Solidago gi>	Southern de>	Box elder	Solidago gi>	Southern de>	
Rating Date	6/19/14	6/19/14	6/19/14	6/19/14	7/17/14	7/17/14	7/17/14	
Rating Data Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	
Rating Unit	%	%	%	%	%	%	%	
Trt Treatment	Rate	9	10	11	12	13	14	15
No. Name	Rate Unit							
1 Triclopyr HL NIS	24 oz ae/a 0.25 % v/v	100.0 a	30.0 a	100.0 a	100.0 a	30.0 a	100.0 a	100.0 a
2 Garlon 3A NIS	24 oz ae/a 0.25 % v/v	100.0 a	40.0 a	100.0 a	100.0 a	40.0 a	100.0 a	100.0 a
3 Untreated Check		0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSD (P=Various)		0.00	65.73	0.00	0.00	65.73	0.00	0.00
Standard Deviation		0.00	18.71	0.00	0.00	18.71	0.00	0.00
CV		0.0	53.45	0.0	0.0	53.45	0.0	0.0
Bartlett's X2		0.0	0.511	0.0	0.0	0.511	0.0	0.0
P(Bartlett's X2)		.	0.475	.	.	0.475	.	.
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		0.000	0.143	0.000	0.000	0.143	0.000	0.000
Replicate Prob(F)		1.0000	0.8750	1.0000	1.0000	0.8750	1.0000	1.0000
Treatment F		0.000	0.429	0.000	0.000	0.429	0.000	0.000
Treatment Prob(F)		1.0000	0.5799	1.0000	1.0000	0.5799	1.0000	1.0000

Means followed by same letter do not differ significantly.

Chart 50. Comparison of triclopyr HL and TEA efficacy on box elder (*Acer negundo*) at 1, 2, and 3 MAT.



**Efficacy of triclopyr HL formulation versus triclopyr TEA for woody plant
Control - Chinese Privet**

Protocol ID: NA14L1A003

Trial ID: NA14L1A003

Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

General Trial Information

Study Director: Victor

Investigator: John Byrd

Trial Location

City: Starkville

Trial Status: Completed

State/Prov.: MS

Trial Reliability: _____

Directions: MSU PSRC (North Farm).

Conducted Under GLP:

Official Trial Code: _____

Conducted Under GEP:

Other Trial Code: _____

Results and Discussion**Chinese Privet Response**

Activity was good on Chinese privet (*Ligustrum sinense*) up to 60 DAT with both treatments. Regrowth occurred on privet and Japanese honeysuckle (*Lonicera japonica*) by 60 DAT in all plots where they occurred. As a result of regrowth, Chinese privet control was reduced to around 75 percent and no control of Japanese honeysuckle by 90 DAT for both herbicide treatments.

Other Species Responses

At 60 DAT, activity was observed on poison ivy (*Toxicodendron radicans*), roughleaf dogwood (*Cornus drummondii*), and multiflora rose (*Rosa multiflora*) but species did not occur in all treatments across all replications, thus data analyses were not performed. Very little activity on peppervine (*Ampelopsis arborea*), cherrybark oak (*Quercus pagoda*), common persimmon (*Diospyros virginiana*), green ash (*Fraxinus pennsylvanica*), or pecan (*Carya illinoensis*) was observed in plots where they occurred at the rates used in this study. However, these species occurrences were not replicated and no data analyses were performed.

Overall Conclusions

Both products performed similarly and there were no significant differences throughout the study. Both products had good activity on Chinese privet early, but regrowth limited treatment effects over time at the rates used in this study.

Site and Design

Plot Width, Unit: 10 FT

Site Type: _____

Plot Length, Unit: 30 FT

Tillage Type: _____

Replications: 3

Study Design: Randomized Complete Block

Application Description

	A
Application Date:	4/24/14
Time of Day:	1:30 PM
Application Method:	SPRAY
Application Timing:	NCPOPE
Application Placement:	FOLIAR
Applied By:	V Maddox
Air Temperature, Unit:	84 F
% Relative Humidity:	60
Wind Velocity, Unit:	5 MPH
Wind Direction:	S
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	80

**Efficacy of triclopyr HL formulation versus triclopyr TEA for woody plant
Control - Chinese Privet (Continued)**

Protocol ID: NA14L1A003

Trial ID: NA14L1A003

Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	2 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Equipment Comment: Sidetrim application

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Triclopyr HL	4	LBAE/GAL	SL	24	oz ae/a	A	30.0 ml/mx	101	203	301
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	Garlon 3A	3	LBAE/GAL	SC	24	oz ae/a	A	40.0 ml/mx	102	201	302
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	CHK	Untreated Check								103	202	303

**Efficacy of triclopyr HL formulation versus triclopyr TEA for woody plant
Control - Chinese Privet (Continued)**

Protocol ID: NA14L1A003 Trial ID: NA14L1A003
 Location: Starkville, MS Study Director: Victor Maddox
 Investigator: John Byrd

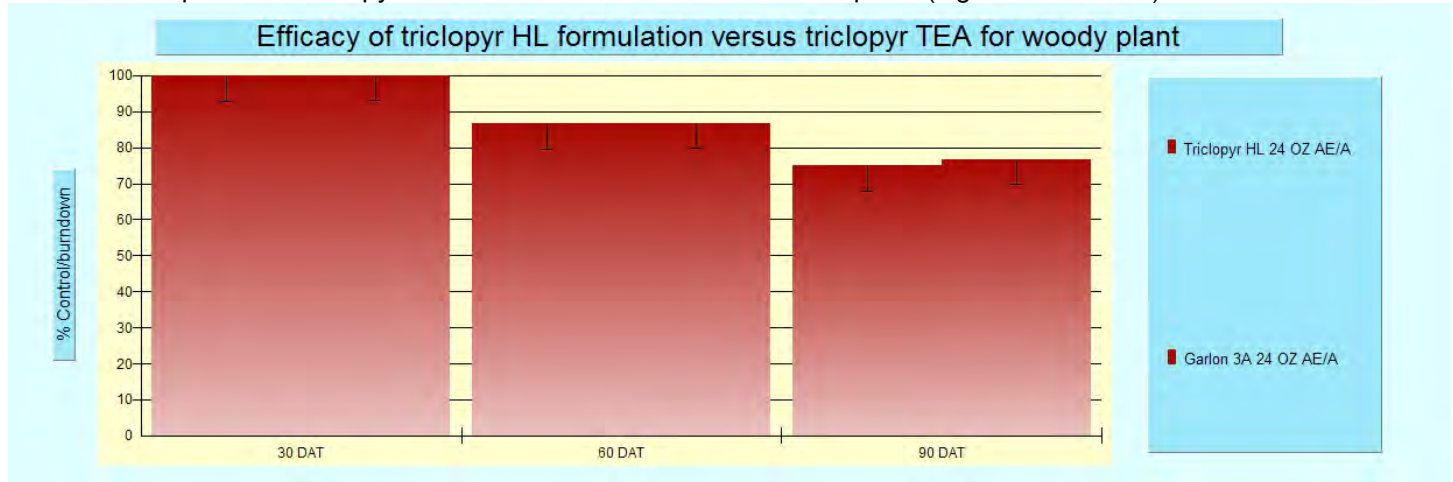
Pest Name		Chinese pri> 4/24/14	Japanese ho> 4/24/14	Chinese pri> 5/22/14	Japanese ho> 5/22/14	Overall 5/22/14	Chinese pri> 6/19/14	Japanese ho> 6/19/14
Rating Date		GROUND	GROUND	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Data Type		%	%	%	%	%	%	%
Rating Unit		%	%	%	%	%	%	%
Trt Treatment	Rate							
No. Name	Rate Unit							
1 Triclopyr HL NIS	24 oz ae/a 0.25 % v/v	63.3	11.7	100.0 a	56.7 a	80.0 a	86.7 a	36.7 a
2 Garlon 3A NIS	24 oz ae/a 0.25 % v/v	46.7	36.7	100.0 a	53.3 a	76.7 a	86.7 a	43.3 a
3 Untreated Check		43.3	23.3	0.0	0.0	0.0	0.0	0.0
LSD (P=Various)		47.78	36.04	0.00	14.34	51.72	0.00	28.69
Standard Deviation		21.08	15.90	0.00	4.08	14.72	0.00	8.16
CV		41.25	66.55	0.0	7.42	18.79	0.0	20.41
Bartlett's X2		0.235	2.014	0.0	0.066	1.816	0.0	0.426
P(Bartlett's X2)		0.889	0.365	.	0.797	0.178	1.00	0.514
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		0.025	2.451	0.000	93.000	0.538	0.000	12.000
Replicate Prob(F)		0.9755	0.2019	1.0000	0.0106	0.6500	1.0000	0.0769
Treatment F		0.775	1.857	0.000	1.000	0.077	0.000	1.000
Treatment Prob(F)		0.5194	0.2689	1.0000	0.4226	0.8076	1.0000	0.4226

Means followed by same letter do not significantly differ.

Pest Name		Overall 6/19/14	Chinese pri> 7/17/14	Japanese ho> 7/17/14	Overall 7/17/14
Rating Date		CONTRO	CONTRO	CONTRO	CONTRO
Rating Data Type		%	%	%	%
Rating Unit		%	%	%	%
Trt Treatment	Rate				
No. Name	Rate Unit				
1 Triclopyr HL NIS	24 oz ae/a 0.25 % v/v	70.0 a	75.0 a	0.0 a	48.3 a
2 Garlon 3A NIS	24 oz ae/a 0.25 % v/v	63.3 a	76.7 a	0.0 a	56.7 a
3 Untreated Check		0.0	0.0	0.0	0.0
LSD (P=Various)		28.69	7.17	0.00	58.70
Standard Deviation		8.16	2.04	0.00	16.71
CV		12.25	2.69	0.0	31.83
Bartlett's X2		0.0	0.013	0.0	0.068
P(Bartlett's X2)		.	0.908	.	0.794
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		1.000	91.000	0.000	0.851
Replicate Prob(F)		0.5000	0.0109	1.0000	0.5403
Treatment F		1.000	1.000	0.000	0.373
Treatment Prob(F)		0.4226	0.4226	1.0000	0.6035

Means followed by same letter do not significantly differ.

Chart 52. Comparison of triclopyr HL and TEA formulations on Chinese privet (*Ligustrum sinense*).



**2014 IVM - Opensight and Milestone in MS DOT Standards Trial
Application A**

Protocol ID: NA14L1B011	Trial ID: NA14L1B011
Location: Kilmichael, MS	Study Director: Victor Maddox
	Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Trial Location

City: Kilmichael	Trial Status: <u> Completed </u>
State/Prov.: MS	Trial Reliability: <u> </u>

N -Latitude of LL Corner °: 33.43858 W -Longitude of LL Corner °: 89.52311

Conducted Under GLP: <u> </u>	Official Trial Code: <u> </u>
Conducted Under GEP: X	Other Trial Code: <u> </u>

Result and Discussion

This section only includes the application applied on April 11, 2014 (**Application A**) as described below under Application Description. The second application (June 2, 2014) or **Application B** will be discussed in the next section.

Turf Responses to Application A

Tall fescue (*Schedonorus arundinaceus*) seedhead number and canopy height were suppressed by this first application and remained relatively unchanged through 90 DAT (Chart 53), thus no data were collected on these perimeters at 90 DAT. This indicates that the timing of this application was within the window to suppress tall fescue height and seedhead development.

Some suppression in height and seedhead number of bahiagrass was observed at 90 DAT (Chart 54). However, differences were not significantly less than the check, indicating this application was too early for significant suppression of bahiagrass. Note that the second application successfully suppressed bahiagrass seedheads and canopy height (although turf discoloration was observed).

Bermudagrass (*Cynodon dactylon*) showed little response following the first application in this study. It is possible that height was slightly decreased and cover slightly increased compared to the untreated, but differences were not significant.

Overall groundcover was significantly decreased by all herbicide treatments at 1 MAT. Although differences were still evident at 2 MAT, they were not significant compared to the untreated.

Weed Responses to Application A

Broadleaf weed response to these applications was observed early. At 1 MAT, Opensight plus Accord (11.7) had the least percentage of broadleaf weed cover followed by Milestone (25) plus Accord and then Oust plus Accord (40). Each increment was significant. By 2 MAT, there were no significant differences between herbicide treatments, but all had significantly less weed cover than the untreated.

On September 1, 2014, control of Japanese lespedeza (*Kummerowia striata*) was observed in herbicide treated plots, almost 5 months following the application (Chart 55). It should be noted that Japanese lespedeza emergence was not observed at the time of application on April 11. This indicates possible herbicide residual, but not likely from Accord (glyphosate). The trend was similar to overall weed response with Opensight showing the greatest control at 95 percent, followed by Milestone (88.3) and Oust (48.3). Interestingly, Japanese lespedeza is relatively common on roadsides in MS (based upon a statewide survey of plant species that occur on MDOT roadsides). Oust plus glyphosate has been in regular use on MDOT roadsides for many years, hence it's inclusion in this study as a standard treatment. Its reduced control of Japanese lespedeza may in part explain why it is so common on MS roadsides. However, more study is needed to support this observation.

**2014 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)
Application A**

Protocol ID: NA14L1B011
Location: Kilmichael, MS

Trial ID: NA14L1B011
Study Director: Victor Maddox
Investigator: John Byrd

Site and Design

Plot Width, Unit: 10 FT **Site Type:** _____
Plot Length, Unit: 30 FT **Tillage Type:** _____
Replications: 3 **Study Design:** Randomized Complete Block

Trial Initiation Comments:

Each plot started at the vegetation line (edge of gravel) in the clear zone and crossed the ditch up the slope into the flat area beyond the ditch. Study site had not been recently mowed.

Application Description

	A	B
Application Date:	4/11/14	6/2/14
Time of Day:	11:00 AM	3:00 PM
Application Method:	SPRAY	SPRAY
Application Timing:	NCPOPE	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	V Maddox	V. Maddox
Air Temperature, Unit:	70 F	85 F
% Relative Humidity:	60	60
Wind Velocity, Unit:	4 MPH	5 MPH
Wind Direction:	S	SE
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	10	50

Application Equipment

	A	B
Appl. Equipment:	CO2 Backpack	CO2 Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Tank Mix (Y/N):	Y	Y

2014 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)

Application A

Protocol ID: NA14L1B011

Trial ID: NA14L1B011

Location: Kilmichael, MS

Study Director: Victor Maddox

Investigator: John Byrd

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

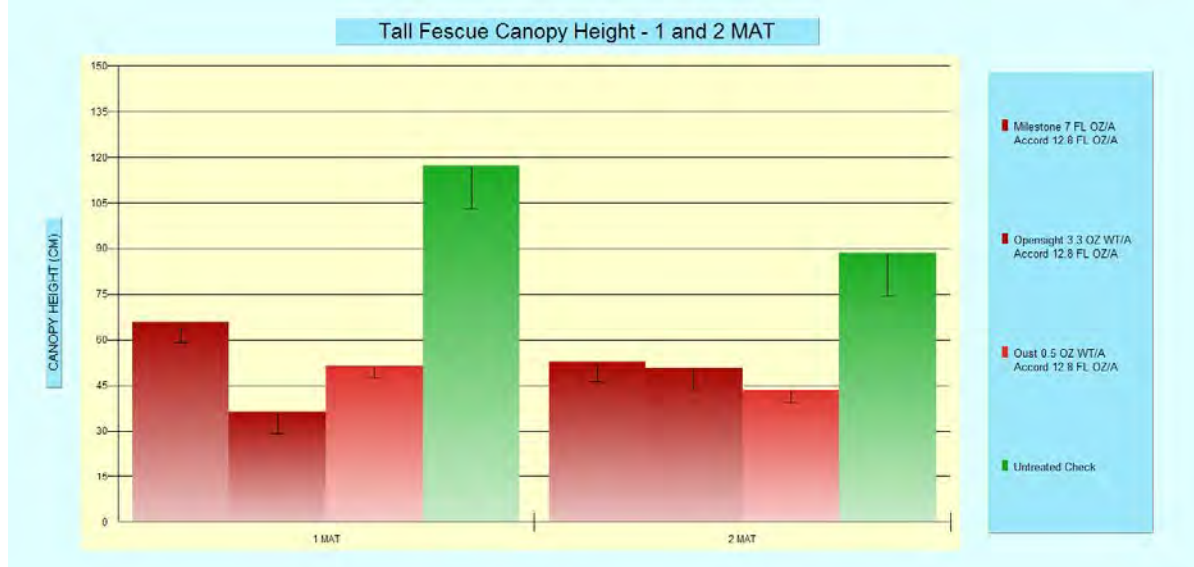
Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Milestone	2	LB/GAL	SL	7	fl oz/a	A	4.375 ml/mx	101	207	305
	HERB	Accord	4	LB/GAL	SL	12.8	fl oz/a	A	8.0 ml/mx			
2	HERB	Oversight	61.95	%AEW/W	WG	3.3	oz wt/a	A	1.977 g/mx	102	204	303
	HERB	Accord	4	LB/GAL	SL	12.8	fl oz/a	A	8.0 ml/mx			
3	HERB	Oust	75	%AW/W	SG	0.5	oz wt/a	A	0.2996 g/mx	103	209	308
	HERB	Accord	4	LB/GAL	SL	12.8	fl oz/a	A	8.0 ml/mx			
10	CHK	Untreated Check								110	208	304

Pest Name	WEEDS	Overall	Weeds	Overall	FESAR BGRM Tall fescue 5/9/14	FESAR BGRM Tall fescue 5/9/14	Overall	Weeds	FESAR BGRM Tall fescue 6/9/14				
Crop Code					COPLPA NUMBER	HEIGHT CM			COPLPA NUMBER				
BBCH Scale													
Crop Name													
Rating Date	4/25/14	4/25/14	5/9/14	5/9/14	6/9/14	6/9/14	6/9/14	6/9/14	6/9/14				
Rating Data Type	CONTRO	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND				
Rating Unit	%	%	%	%	%	%	%	%	%				
Trt No.	Treatment Name	Rate	Rate Unit	1	2	3	4	5	6	7	8	9	
1	Milestone	7	fl oz/a	66.7	68.3	25.0	c	65.0	b	44.0	a	65.667	b
	Accord	12.8	fl oz/a										
2	Oversight	3.3	oz wt/a	70.0	68.3	11.7	d	60.0	b	12.3	a	36.220	b
	Accord	12.8	fl oz/a										
3	Oust	0.5	oz wt/a	60.0	70.0	40.0	b	63.3	b	20.7	a	51.333	b
	Accord	12.8	fl oz/a										
10	Untreated Check			0.0	68.3	70.0	a	83.3	a	101.7	a	117.333	a
	LSD (P=Various)			5.77	5.77	12.90		10.13		75.16		39.1963	
	Standard Deviation			2.89	2.89	6.45		5.07		37.62		19.6181	
	CV			5.87	4.2	17.6		7.46		84.22		29.0	
	Bartlett's X2			0.0	0.0	2.589		0.048		6.458		7.244	
	P(Bartlett's X2)			.	1.00	0.274		0.976		0.091		0.065	
	Mean Sep. Test					LSD.05		LSD.05		LSD.05		LSD.05	
	Replicate F			1.000	0.000	0.200		0.568		0.141		0.594	
	Replicate Prob(F)			0.4219	1.0000	0.8240		0.5946		0.8715		0.5814	
	Treatment F			393.000	0.250	45.200		12.838		3.442		9.682	
	Treatment Prob(F)			0.0001	0.8587	0.0002		0.0051		0.0923		0.0102	

Means followed by same letter do not differ significantly.

Chart 53. Tall fescue (*Schedonorus arundinaceus*) canopy height (cm) at 1 and 2 MAT first application.



**2014 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)
Application A**

Protocol ID: NA14L1B011

Trial ID: NA14L1B011

Location: Kilmichael, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		FESAR	FESAR	PASNO	PASNO	PASNO	CYNDA	CYNDA	Overall
Crop Code		BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	BGRM	
BBCH Scale		Tall fescue	Tall fescue	Bahiagrass	Bahiagrass	Bahiagrass	Bermuda gra>	Bermuda gra>	
Crop Name		6/9/14	6/9/14	7/4/14	7/4/14	7/4/14	7/4/14	7/4/14	7/2/14
Rating Date		GROUND	HEIGHT	GROUND	HEIGHT	COPLPA	GROUND	HEIGHT	GROUND
Rating Data Type		CM	CM	%	CM	M2	%	CM	%
Rating Unit									
Trt Treatment	Rate								
No. Name	Rate Unit	10	11	12	13	14	15	16	17
1 Milestone	7 fl oz/a	5.0 a	52.7 b	33.3 a	52.0 a	26.3 a	33.3 a	15.7 a	
Accord	12.8 fl oz/a								
2 Opensight	3.3 oz wt/a	5.0 a	50.7 b	36.7 a	48.3 a	15.7 a	33.3 a	16.0 a	
Accord	12.8 fl oz/a								
3 Oust	0.5 oz wt/a	5.0 a	43.3 b	33.3 a	47.7 a	19.0 a	36.7 a	17.3 a	
Accord	12.8 fl oz/a								
10 Untreated Check		5.0 a	88.7 a	30.0 a	58.0 a	36.3 a	30.0 a	19.7 a	80.0
LSD (P=Various)		0.00	31.80	15.97	10.94	16.87	7.45	4.23	.
Standard Deviation		0.00	15.91	7.99	5.47	8.44	3.73	2.11	.
CV		0.0	27.05	23.98	10.63	34.7	11.18	12.32	.
Bartlett's X2		0.0	16.376	0.443	1.842	5.92	0.0	5.063	.
P(Bartlett's X2)		.	0.001*	0.931	0.606	0.116	0.001*	0.167	.
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		0.000	0.895	7.957	0.626	2.091	4.200	0.130	
Replicate Prob(F)		1.0000	0.4570	0.0205	0.5665	0.2047	0.0723	0.8801	
Treatment F		0.000	4.877	0.348	2.243	3.528	1.600	2.211	
Treatment Prob(F)		1.0000	0.0476	0.7925	0.1838	0.0883	0.2853	0.1876	

Means followed by same letter do not differ significantly.

Pest Name	Japanese le>
Crop Code	
BBCH Scale	
Crop Name	
Rating Date	9/1/14
Rating Data Type	CONTRO
Rating Unit	%
Trt Treatment	Rate
No. Name	Rate Unit
1 Milestone	7 fl oz/a
Accord	12.8 fl oz/a
2 Opensight	3.3 oz wt/a
Accord	12.8 fl oz/a
3 Oust	0.5 oz wt/a
Accord	12.8 fl oz/a
10 Untreated Check	0.0
LSD (P=Various)	47.56
Standard Deviation	20.98
CV	27.17
Bartlett's X2	3.586
P(Bartlett's X2)	0.058
Mean Sep. Test	LSD.05
Replicate F	1.558
Replicate Prob(F)	0.3159
Treatment F	4.341
Treatment Prob(F)	0.0995

Means followed by same letter do not significantly differ.

2014 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)
Application A

Protocol ID: NA14L1B011
Location: Kilmichael, MS

Trial ID: NA14L1B011
Study Director: Victor Maddox
Investigator: John Byrd

Chart 54. Bahiagrass (*Paspalum notatum*) canopy height (cm) at 1, 2, and 3 MAT first application.

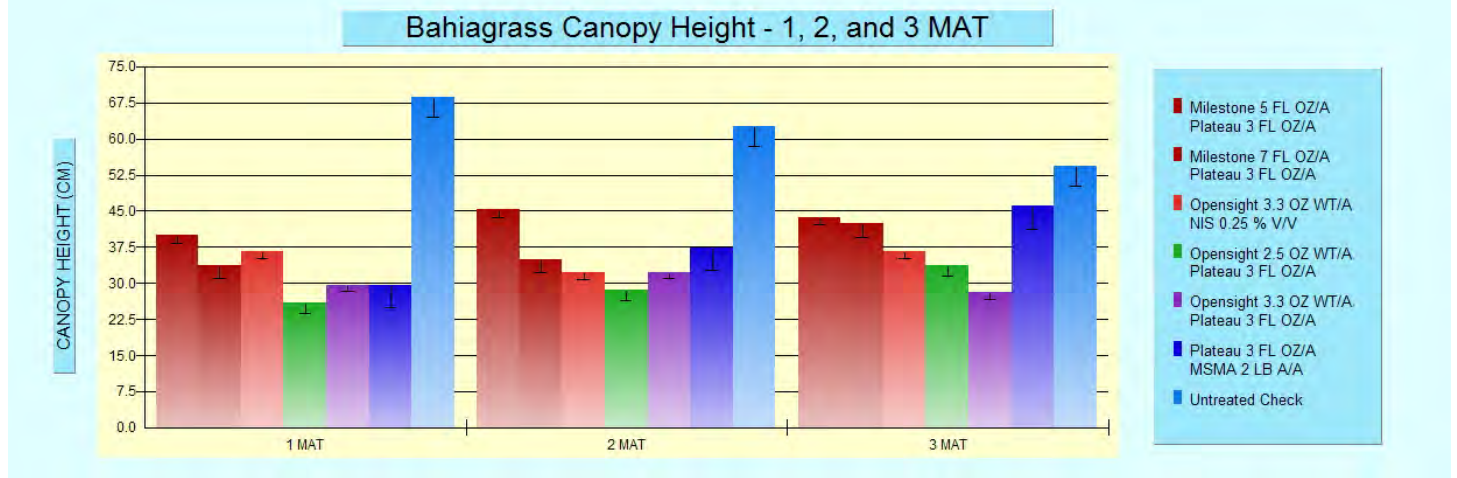
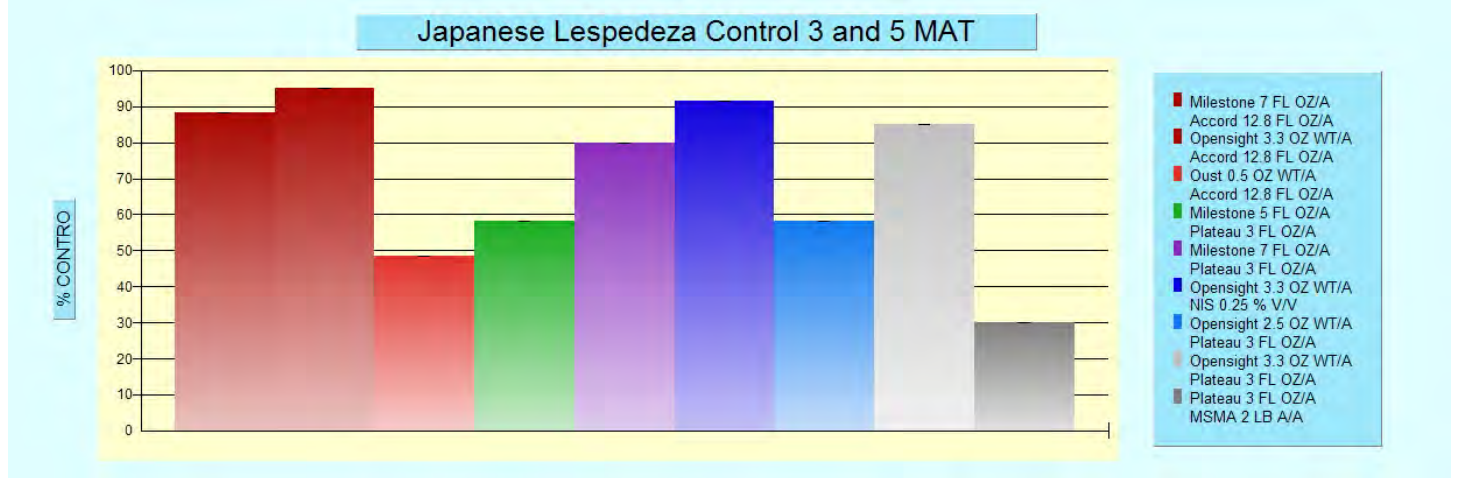


Chart 55. Japanese lespedeza (*Kummerowia striata*) control September 1, 2014, nearly 5 months after first application (first 3 treatments) and 3 months after the second application (last 7 treatments).



**2014 IVM - Opensight and Milestone in MS DOT Standards Trial
Application B**

Protocol ID: NA14L1B011

Trial ID: NA14L1B011

Location: Kilmichael, MS

Study Director: Victor Maddox

Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox

Investigator: John

Trial Location

City: Kilmichael

Trial Status: Completed

State/Prov.: MS

Trial Reliability: _____

N -Latitude of LL Corner °: 33.43858

W -Longitude of LL Corner °: 89.52311

Conducted Under GLP:

Official Trial Code: _____

Conducted Under GEP: X

Other Trial Code: _____

Results and Discussion

This study received two separate applications, one on April 11 and one on June 2. The following includes the June 2 application (**Application B**). All herbicide treatments included an NIS.

Turf Responses to Application

At 1 MAT, bahiagrass (*Paspalum notatum*) showed a significant response to herbicide treatments. Bahiagrass cover was significantly reduced in all herbicide treatments, and only Opensight alone was not significantly less than the untreated. Bahiagrass height was also significantly shorter compared to the untreated. There were no seedheads observed in any herbicide treatments. Even though elimination of seedheads can be desirable, all herbicide treatments showed significant discoloration on bahiagrass. This trend remained through 2 MAT. By 3 MAT, bahiagrass cover in Milestone plus Plateau and Opensight alone treatments was not significantly less than the untreated, but all other treatments had significantly less cover. Height was significantly shorter in all treatments except Plateau plus MSMA which was not significantly shorter than the untreated. Seedhead numbers were less than the untreated, but differences were not significant. There were no observed differences in color at 3 MAT.

Bermudagrass (*Cynodon dactylon*) showed little response to herbicide treatments and both cover and canopy height were not significantly different than the untreated at 1, 2, and 3 MAT during the study.

At 1, 2, and 3 MAT, there were no significant differences in overall cover between treatments.

Weed Responses to Application

At 1 MAT, some control of Canada goldenrod (*Solidago canadensis*) was observed. The best control at this date was from Opensight plus Plateau and Plateau plus MSMA treatments at about 67 percent, but they were not significantly better than Opensight alone (60 %). At 2 MAT, Canada goldenrod control was significantly better in all treatments with Opensight, although Opensight plus Plateau was not significantly better than Plateau plus MSMA. Still, the best treatment was only 80 % control on average. At 3 MAT, control was significantly better in all treatments with Opensight. The best of these three treatments was the higher rate (3.3 oz/A) of Opensight in combination with Plateau which showed just over 93 percent control.

Opensight alone at 3.3 oz/A showed the best control (91.7%) on Japanese lespedeza (*Kummerowia striata*) in the study at 3 MAT (Chart 55, see previous study-Application A). However, it was not significantly better than other herbicide treatments.

Overall Conclusions

The herbicide treatments in this study do effect bahiagrass cover, height, seedhead number, and color. In general, seedhead reduction comes at the cost of reduced cover and discoloration. This should be weighed when using herbicide treatments for seedhead reduction.

Treatments also influenced weeds, particularly Canada goldenrod and Japanese lespedeza, in the study. There were significant differences in Canada goldenrod control with 93 percent being the highest through 90 DAT. The highest Japanese lespedeza control was about 92 percent observed at 3 MAT. These are both common weed species on roadsides in MS, with goldenrod being an issue due to height and lespedeza possibly an issue by attracting deer close to the paved surface. This latter issue needs further study in regard to vehicle-deer collisions.

**2014 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)
Application B**

Protocol ID: NA14L1B011
Location: Kilmichael, MS

Trial ID: NA14L1B011
Study Director: Victor Maddox
Investigator: John Byrd

Site and Design

Plot Width, Unit: 10 FT **Site Type:** _____
Plot Length, Unit: 30 FT **Tillage Type:** _____
Replications: 3 **Study Design:** Randomized Complete Block

Trial Initiation Comments:

Each plot started at the vegetation line (edge of gravel) in the clear zone and crossed the ditch up the slope into the flat area beyond the ditch. Study site had not been recently mowed.

Application Description

	A	B
Application Date:	4/11/14	6/2/14
Time of Day:	11:00 AM	3:00 PM
Application Method:	SPRAY	SPRAY
Application Timing:	NCPOPE	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	V Maddox	V. Maddox
Air Temperature, Unit:	70 F	85 F
% Relative Humidity:	60	60
Wind Velocity, Unit:	4 MPH	5 MPH
Wind Direction:	S	SE
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	10	50

Application Equipment

	A	B
Appl. Equipment:	CO2 Backpack	CO2 Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Tank Mix (Y/N):	Y	Y

**2014 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)
Application B**

Protocol ID: NA14L1B011
Location: Kilmichael, MS

Trial ID: NA14L1B011
Study Director: Victor Maddox
Investigator: John Byrd

Reps: 3 Plots: 10 by 30 feet
Spray vol: 25 gal/ac Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
4	HERB	Milestone	2	LB/GAL	SL	5	fl oz/a	B	3.125 ml/mx	104	203	301
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
5	HERB	Milestone	2	LB/GAL	SL	7	fl oz/a	B	4.375 ml/mx	105	210	309
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
6	HERB	Oversight	61.95	%AEW/W	WG	3.3	oz wt/a	B	1.977 g/mx	106	205	302
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
7	HERB	Oversight	61.95	%AEW/W	WG	2.5	oz wt/a	B	1.498 g/mx	107	202	306
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
8	HERB	Oversight	61.95	%AEW/W	WG	3.3	oz wt/a	B	1.977 g/mx	108	201	310
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
9	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx	109	206	307
	HERB	MSMA	6	LBA/GAL	SC	2	lb ai/a	B	26.66 ml/mx			
10	CHK	Untreated Check								110	208	304

Pest Name Crop Code BBCH Scale Crop Name Rating Date Rating Data Type Rating Unit	WEEDS	Overall	Weeds	Overall	FESAR BGRM Tall fescue 5/9/14 COPLPA NUMBER	FESAR BGRM Tall fescue 5/9/14 HEIGHT CM	Overall	Weeds	FESAR BGRM Tall fescue 6/9/14 COPLPA NUMBER
	4/25/14 CONTRO %	4/25/14 GROUND %	5/9/14 GROUND %	5/9/14 GROUND %	5/9/14 GROUND %	5/9/14 GROUND %	6/9/14 GROUND %	6/9/14 GROUND %	6/9/14 GROUND %
Trt Treatment Rate	1	2	3	4	5	6	7	8	9
4 Milestone 5 fl oz/a		70.0							
Plateau 3 fl oz/a									
5 Milestone 7 fl oz/a		68.3							
Plateau 3 fl oz/a									
6 Oversight 3.3 oz wt/a		65.0							
NIS 0.25 % v/v									
7 Oversight 2.5 oz wt/a		68.3							
Plateau 3 fl oz/a									
8 Oversight 3.3 oz wt/a		68.3							
Plateau 3 fl oz/a									
9 Plateau 3 fl oz/a		68.3							
MSMA 2 lb ai/a									
10 Untreated Check	0.0	68.3	70.0	83.3	101.7	117.3	81.7	33.3	105.7
LSD (P=Various)	.	4.19	.	.	.	.	.	.	.
Standard Deviation	.	2.36	.	.	.	.	.	.	.
CV	.	3.46	.	.	.	.	.	.	.
Bartlett's X2	.	0.0	.	.	.	.	.	.	.
P(Bartlett's X2)	.	1.00	.	.	.	.	.	.	.
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		1.500							
Replicate Prob(F)		0.2621							
Treatment F		1.214							
Treatment Prob(F)		0.3635							

Means followed by same letter do not differ significantly.

**2014 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)
Application B**

Protocol ID: NA14L1B011
Location: Kilmichael, MS

Trial ID: NA14L1B011
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		FESAR BGRM	FESAR BGRM	PASNO BGRM	PASNO BGRM	PASNO BGRM	CYNDA BGRM	CYNDA BGRM	Overall	
Crop Code		Tall fescue	Tall fescue	Bahiagrass	Bahiagrass	Bahiagrass	Bermuda gra>	Bermuda gra>		
Crop Name		6/9/14	6/9/14	7/4/14	7/4/14	7/4/14	7/4/14	7/4/14	7/2/14	
Rating Date		GROUND	HEIGHT	GROUND	HEIGHT	COPLPA	GROUND	HEIGHT	GROUND	
Rating Data Type		CM	CM	%	CM	M2	%	CM	%	
Rating Unit										
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Overall	
		Unit	Unit	Unit	Unit	Unit	Unit	Unit		
		10	11	12	13	14	15	16	17	
4	Milestone Plateau	5 fl oz/a 3 fl oz/a							78.3 a	
5	Milestone Plateau	7 fl oz/a 3 fl oz/a							78.3 a	
6	Opensight NIS	3.3 oz wt/a 0.25 % v/v							76.7 a	
7	Opensight Plateau	2.5 oz wt/a 3 fl oz/a							76.7 a	
8	Opensight Plateau	3.3 oz wt/a 3 fl oz/a							76.7 a	
9	Plateau MSMA	3 fl oz/a 2 lb ai/a							76.7 a	
10	Untreated Check		5.0	88.7	30.0	58.0	36.3	30.0	19.7	80.0 a
	LSD (P=Various)		3.27
	Standard Deviation		1.84
	CV		2.37
	Bartlett's X2		0.0
	P(Bartlett's X2)		1.00
	Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F									8.824
	Replicate Prob(F)									0.0044
	Treatment F									1.529
	Treatment Prob(F)									0.2498

Means followed by same letter do not differ significantly.

**2014 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)
Application B**

Protocol ID: NA14L1B011
Location: Kilmichael, MS

Trial ID: NA14L1B011
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		PASNO	PASNO	PASNO	CYNDA	CYNDA	Weeds	PASNO	Overall	
Crop Code		BGRM	BGRM	BGRM	BGRM	BGRM	SOOCA	BGRM		
BBCH Scale		Bahiagrass	Bahiagrass	Bahiagrass	Bermuda gra>	Bermuda gra>	BDIC	Bahiagrass		
Crop Name		7/2/14	7/2/14	7/2/14	7/2/14	7/2/14	Canadian go>	7/2/14	8/1/14	
Rating Date		GROUND	HEIGHT	COPLPA	GROUND	HEIGHT	7/2/14	7/2/14	GROUND	
Rating Data Type		%	CM	M2	%	CM	CONTRO	COLOR	%	
Rating Unit							%	1-9	%	
Trt	Treatment	Rate								
No.	Name	Rate Unit	18	19	20	21	22	23	24	25
4	Milestone Plateau	5 fl oz/a 3 fl oz/a	15.0 bc	40.0 b	0.0 b	23.3 a	21.3 a	18.3 c	5.67 b	78.3 a
5	Milestone Plateau	7 fl oz/a 3 fl oz/a	20.0 bc	33.7 bcd	0.0 b	28.3 a	19.0 a	26.7 c	5.00 bc	78.3 a
6	Opensight NIS	3.3 oz wt/a 0.25 % v/v	21.7 ab	36.7 bc	0.0 b	25.0 a	20.3 a	60.0 ab	4.83 bcd	76.7 a
7	Opensight Plateau	2.5 oz wt/a 3 fl oz/a	20.0 bc	26.0 d	0.0 b	25.0 a	19.0 a	46.7 b	4.17 cd	76.7 a
8	Opensight Plateau	3.3 oz wt/a 3 fl oz/a	11.7 c	29.7 cd	0.0 b	28.3 a	21.7 a	66.7 a	4.17 cd	76.7 a
9	Plateau MSMA	3 fl oz/a 2 lb ai/a	16.7 bc	29.7 cd	0.0 b	33.3 a	25.0 a	66.7 a	4.00 d	76.7 a
10	Untreated Check		30.0 a	68.7 a	36.3 a	28.3 a	19.7 a	0.0	8.00 a	80.0 a
	LSD (P=Various)		9.71	8.88	10.81	12.46	6.89	16.52	0.890	3.27
	Standard Deviation		5.46	4.99	6.07	7.00	3.87	9.08	0.500	1.84
	CV		28.29	13.22	117.04	25.57	18.57	19.12	9.77	2.37
	Bartlett's X2		3.924	2.724	0.0	3.642	12.589	5.327	5.032	0.0
	P(Bartlett's X2)		0.687	0.843	.	0.602	0.05	0.377	0.284	1.00
	Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F		1.560	1.091	1.000	0.462	0.086	0.354	0.333	8.824
	Replicate Prob(F)		0.2499	0.3669	0.3966	0.6410	0.9185	0.7106	0.7230	0.0044
	Treatment F		3.440	25.037	15.330	0.672	0.887	15.828	23.524	1.529
	Treatment Prob(F)		0.0326	0.0001	0.0001	0.6748	0.5332	0.0002	0.0001	0.2498

Means followed by same letter do not differ significantly.

2014 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)
Application B

Protocol ID: NA14L1B011
 Location: Kilmichael, MS

Trial ID: NA14L1B011
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name		PASNO	PASNO	PASNO	CYNDA	CYNDA	Weeds	PASNO	Overall	
Crop Code		BGRM	BGRM	BGRM	BGRM	BGRM	SOOCA	BGRM		
BBCH Scale		Bahiagrass	Bahiagrass	Bahiagrass	Bermuda gra>	Bermuda gra>	BDIC	Bahiagrass		
Crop Name		8/1/14	8/1/14	8/1/14	8/1/14	8/1/14	Canadian go>	8/1/14	9/1/14	
Rating Date		GROUND	HEIGHT	COPLPA	HEIGHT	GROUND	8/1/14	8/1/14	GROUND	
Rating Data Type		%	CM	M2	CM	%	CONTRO	COLOR	%	
Rating Unit							%	1-9		
Trt	Treatment	Rate								
No.	Name	Rate Unit	26	27	28	29	30	31	32	33
4	Milestone Plateau	5 fl oz/a 3 fl oz/a	15.0 bc	45.3 b	1.0 b	19.3 a	23.3 a	10.0 c	6.33 b	56.0 a
5	Milestone Plateau	7 fl oz/a 3 fl oz/a	20.0 bc	35.0 c	0.0 b	20.0 a	28.3 a	11.7 c	6.00 b	80.0 a
6	Opensight NIS	3.3 oz wt/a 0.25 % v/v	21.7 ab	32.3 c	0.0 b	20.0 a	25.0 a	80.0 a	5.17 c	80.0 a
7	Opensight Plateau	2.5 oz wt/a 3 fl oz/a	16.7 bc	28.7 c	0.0 b	20.3 a	25.0 a	66.7 ab	5.17 c	80.0 a
8	Opensight Plateau	3.3 oz wt/a 3 fl oz/a	11.7 c	32.3 c	0.0 b	21.0 a	28.3 a	76.7 a	5.00 c	80.0 a
9	Plateau MSMA	3 fl oz/a 2 lb ai/a	16.7 bc	37.3 bc	0.3 b	21.0 a	33.3 a	50.0 b	6.67 b	80.0 a
10	Untreated Check		30.0 a	62.7 a	37.0 a	19.3 a	28.3 a	0.0	8.00 a	83.3 a
	LSD (P=Various)		9.31	9.03	6.59	3.41	12.46	25.67	0.752	27.90
	Standard Deviation		5.23	5.07	3.70	1.91	7.00	14.11	0.423	15.68
	CV		27.82	12.98	67.63	9.51	25.57	28.7	6.99	20.35
	Bartlett's X2		4.887	3.893	13.151	3.299	3.642	1.405	0.284	5.021
	P(Bartlett's X2)		0.558	0.691	0.001*	0.77	0.602	0.843	0.963	0.025*
	Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F		1.609	2.076	1.170	1.909	0.462	0.146	4.267	1.163
	Replicate Prob(F)		0.2405	0.1681	0.3434	0.1906	0.6410	0.8656	0.0398	0.3455
	Treatment F		3.826	15.815	42.299	0.390	0.672	14.925	19.400	1.070
	Treatment Prob(F)		0.0229	0.0001	0.0001	0.8719	0.6748	0.0002	0.0001	0.4315

Means followed by same letter do not differ significantly.

**2014 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)
Application B**

Protocol ID: NA14L1B011
Location: Kilmichael, MS

Trial ID: NA14L1B011
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		PASNO	PASNO	PASNO	CYNDA	CYNDA	Weeds	PASNO	
Crop Code		BGRM	BGRM	BGRM	BGRM	BGRM	SOOCA	BGRM	
BBCH Scale		Bahiagrass	Bahiagrass	Bahiagrass	Bermuda gra>	Bermuda gra>	BDIC	Bahiagrass	
Crop Name		9/1/14	9/1/14	9/1/14	9/1/14	9/1/14	Canadian go>	9/1/14	
Rating Date		GROUND	HEIGHT	COPLPA	HEIGHT	GROUND	9/1/14	9/1/14	
Rating Data Type		%	CM	M2	CM	%	CONTRO	COLOR	
Rating Unit							%	1-9	
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate	Rate	Rate	
		Unit	Unit	Unit	Unit	Unit	Unit	Unit	
		34	35	36	37	38	39	40	
4	Milestone Plateau	5 fl oz/a 3 fl oz/a	18.3 b	43.7 b	1.7 a	19.7 a	23.3 a	11.7 c	7.0 a
5	Milestone Plateau	7 fl oz/a 3 fl oz/a	21.7 ab	42.3 bc	0.0 a	20.0 a	28.3 a	6.7 c	7.0 a
6	Opensight NIS	3.3 oz wt/a 0.25 % v/v	21.7 ab	36.7 bcd	0.7 a	20.0 a	25.0 a	81.7 ab	7.0 a
7	Opensight Plateau	2.5 oz wt/a 3 fl oz/a	15.0 b	33.7 cd	0.0 a	20.3 a	25.0 a	81.7 ab	7.0 a
8	Opensight Plateau	3.3 oz wt/a 3 fl oz/a	11.7 b	28.0 d	0.0 a	21.0 a	28.3 a	93.3 a	7.0 a
9	Plateau MSMA	3 fl oz/a 2 lb ai/a	16.7 b	46.0 ab	5.0 a	21.0 a	33.3 a	63.3 b	7.0 a
10	Untreated Check		31.7 a	54.3 a	8.3 a	19.3 a	28.3 a	0.0	7.0 a
	LSD (P=Various)		10.87	9.59	6.03	3.24	12.46	29.83	0.00
	Standard Deviation		6.11	5.39	3.39	1.82	7.00	16.40	0.00
	CV		31.28	13.25	151.47	9.03	25.57	29.08	0.0
	Bartlett's X2		4.335	2.897	4.832	3.504	3.642	8.756	0.0
	P(Bartlett's X2)		0.631	0.822	0.185	0.743	0.602	0.119	.
	Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F		2.043	7.112	0.526	2.119	0.462	1.508	0.000
	Replicate Prob(F)		0.1724	0.0092	0.6038	0.1628	0.6410	0.2676	1.0000
	Treatment F		3.330	7.792	2.724	0.363	0.672	15.985	0.000
	Treatment Prob(F)		0.0361	0.0014	0.0659	0.8888	0.6748	0.0002	1.0000

Means followed by same letter do not differ significantly.

2014 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)
Application B

Protocol ID: NA14L1B011
 Location: Kilmichael, MS

Trial ID: NA14L1B011
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name			Japanese le>
Crop Code			
BBCH Scale			
Crop Name			
Rating Date			9/1/14
Rating Data Type			CONTRO
Rating Unit			%
Trt No.	Treatment Name	Rate Rate Unit	
			41
4	Milestone Plateau	5 fl oz/a 3 fl oz/a	58.3 a
5	Milestone Plateau	7 fl oz/a 3 fl oz/a	80.0 a
6	Opensight NIS	3.3 oz wt/a 0.25 % v/v	91.7 a
7	Opensight Plateau	2.5 oz wt/a 3 fl oz/a	58.3 a
8	Opensight Plateau	3.3 oz wt/a 3 fl oz/a	85.0 a
9	Plateau MSMA	3 fl oz/a 2 lb ai/a	30.0 a
10	Untreated Check		0.0
LSD (P=Various)			66.09
Standard Deviation			36.33
CV			54.04
Bartlett's X2			12.357
P(Bartlett's X2)			0.03*
Mean Sep. Test			LSD.05
Replicate F			0.342
Replicate Prob(F)			0.7183
Treatment F			1.191
Treatment Prob(F)			0.3791

Means followed by same letter do not differ significantly.

2014 MS DOT Hemp Dogbane Efficacy Trial
Application A

Protocol ID: NA14L1B012
Location: Macon, MS

Trial ID: NA14L1B012
Study Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Trial Location

City: Macon
State/Prov.: MS

Trial Status: _____
Trial Reliability: _____

Conducted Under GLP: _
Conducted Under GEP: X

Official Trial Code: _____
Other Trial Code: _____

Results and Discussion

Objectives:

This study was initiated to evaluate fluroxypyr (Vista XRT) activity on hemp dogbane (*Apocynum cannabinum*) due to concerns with potential triclopyr volatility near crops. Two applications (A and B) were made on fully developed hemp dogbane. In the application discussed here, hemp dogbane was initiating flowering and plant were near mature height. The study site had good cover at 0 DAT dominated by hemp dogbane and poison-ivy (*Toxicodendron radicans*).

Results:

Overall Cover. Overall cover was significantly less in treated plots compared to untreated, a reflection of control activity. This pattern remained until 91 DAT, by which time differences were not significant.

Control. At 51 DAT, all treatments had activity on both species, but better activity on poison-ivy. Products containing Vista XRT had the highest control, although not significant. A similar pattern was observed at 60 and 91 DAT for both species (Chart 56, hemp dogbane).

Conclusions: All herbicides had activity on both species. Higher rates of Vista XRT and combinations containing Vista XRT had better control in general, but were not significantly better than triclopyr alone. This pattern was similar for both hemp dogbane and poison-ivy, but products had better activity on poison-ivy in general. Based upon the results of this study, Vista XRT or Vista XRT plus Milestone could be used in place of triclopyr where situations may warrant.

Site and Design

Plot Width, Unit: 10
Plot Length, Unit: 30
Replications: 3

FT Site Type: _____
FT Tillage Type: _____
Study Design: Randomized Complete Block

2014 MS DOT Hemp Dogbane Efficacy Trial (Continued)

Application A

Protocol ID: NA14L1B012

Trial ID: NA14L1B012

Location: Macon, MS

Study Director: Victor Maddox

Investigator: John Byrd

Application Description

	A	B
Application Date:	5/12/14	6/2/14
Time of Day:	3 PM	1 PM
Application Method:	SPRAY	SPRAY
Application Timing:	POSPOS	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	V. Maddox	V. Maddox
Air Temperature, Unit:	86 F	75 F
% Relative Humidity:	50	60
Wind Velocity, Unit:	5 MPH	5 MPH
Wind Direction:	S	SE
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	80	60

Application Equipment

	A	B
Appl. Equipment:	CO2 Backpack	CO2 Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	3 FT	3 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Tank Mix (Y/N):	Y	Y

2014 MS DOT Hemp Dogbane Efficacy Trial (Continued)

Application A

Protocol ID: NA14L1B012
Location: Macon, MS

Trial ID: NA14L1B012
Study Director: Victor Maddox
Investigator: John Byrd

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	VISTA XRT	2.78	LBAE/GAL	EC	8	fl oz/a	A	5.0 ml/mx	101	209	307
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	VISTA XRT	2.78	LBAE/GAL	EC	12	fl oz/a	A	7.5 ml/mx	102	205	314
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	HERB	VISTA XRT	2.78	LBAE/GAL	EC	12	fl oz/a	A	7.5 ml/mx	103	214	313
	HERB	Milestone	2	LBAE/GAL	SL	7	fl oz/a	A	4.375 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
4	HERB	VISTA XRT	2.78	LBAE/GAL	EC	12	fl oz/a	A	7.5 ml/mx	104	212	303
	HERB	Capstone	1.1	LBAE/GAL	SL	6	pt/a	A	59.99 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
5	HERB	Garlon 3A	3	LBAE/GAL	SC	32	fl oz/a	A	20.0 ml/mx	105	211	310
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
6	HERB	Triclopyr HL	4	LBAE/GAL	SC	24	fl oz/a	A	15.0 ml/mx	106	203	309
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
14	CHK	Untreated Check								114	204	306

2014 MS DOT Hemp Dogbane Efficacy Trial (Continued)

Application A

Protocol ID: NA14L1B012

Trial ID: NA14L1B012

Location: Macon, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Hemp dogbane	Poison-ivy	Hemp dogbane	OVERALL	Hemp dogbane	Poison-ivy	OVERALL	OVERALL			
Crop Code				Overall			Overall	Overall			
BBCH Scale				5/12/14	7/2/14	7/2/14	7/2/14	7/11/14			
Crop Name				GROUND	CONTRO	CONTRO	GROUND	GROUND			
Rating Date	5/12/14	5/12/14	5/12/14	%	%	%	%	%			
Rating Data Type	GROUND	GROUND	MATURI	%	%	%	%	%			
Rating Unit	%	%	%	%	%	%	%	%			
Trt No.	Treatment Name	Rate	Unit	1	2	3	4	5	6	7	8
1	VISTA XRT NIS	8 fl oz/a 0.25 % v/v		30.0	56.7	3.3	91.7	76.7 a	100.0 a	90.0 b	91.7 b
2	VISTA XRT NIS	12 fl oz/a 0.25 % v/v		33.3	46.7	4.3	91.7	90.0 a	98.3 a	90.0 b	91.7 b
3	VISTA XRT Milestone NIS	12 fl oz/a 7 fl oz/a 0.25 % v/v		28.3	53.3	1.3	88.3	88.3 a	100.0 a	90.0 b	91.7 b
4	VISTA XRT Capstone NIS	12 fl oz/a 6 pt/a 0.25 % v/v		30.0	56.7	0.3	91.7	88.3 a	100.0 a	90.0 b	91.7 b
5	Garlon 3A NIS	32 fl oz/a 0.25 % v/v		36.7	40.0	0.3	91.7	71.7 a	83.3 a	90.0 b	91.7 b
6	Triclopyr HL NIS	24 fl oz/a 0.25 % v/v		43.3	43.3	2.0	91.7	75.0 a	80.0 a	90.0 b	90.0 b
14	Untreated Check			31.7	33.3	33.3	90.0	0.0	0.0	96.7 a	95.0 a
	LSD (P=Various)			14.93	28.66	34.17	4.48	29.38	29.41	1.94	2.51
	Standard Deviation			8.39	16.11	19.20	2.52	16.15	16.17	1.09	1.41
	CV			25.18	34.17	298.72	2.77	19.78	17.27	1.2	1.53
	Bartlett's X2			1.959	5.015	46.96	3.886	5.545	6.765	0.0	0.0
	P(Bartlett's X2)			0.743	0.542	0.001*	0.566	0.353	0.034*	.	1.00
	Mean Sep. Test							LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F			2.755	2.862	0.647	9.750	1.741	2.811	1.000	15.000
	Replicate Prob(F)			0.1036	0.0963	0.5412	0.0031	0.2245	0.1075	0.3966	0.0005
	Treatment F			1.144	0.917	1.163	0.813	0.754	1.000	16.000	3.400
	Treatment Prob(F)			0.3953	0.5152	0.3864	0.5801	0.6021	0.4651	0.0001	0.0338

Means followed by same letter do not differ significantly.

2014 MS DOT Hemp Dogbane Efficacy Trial (Continued)
Application A

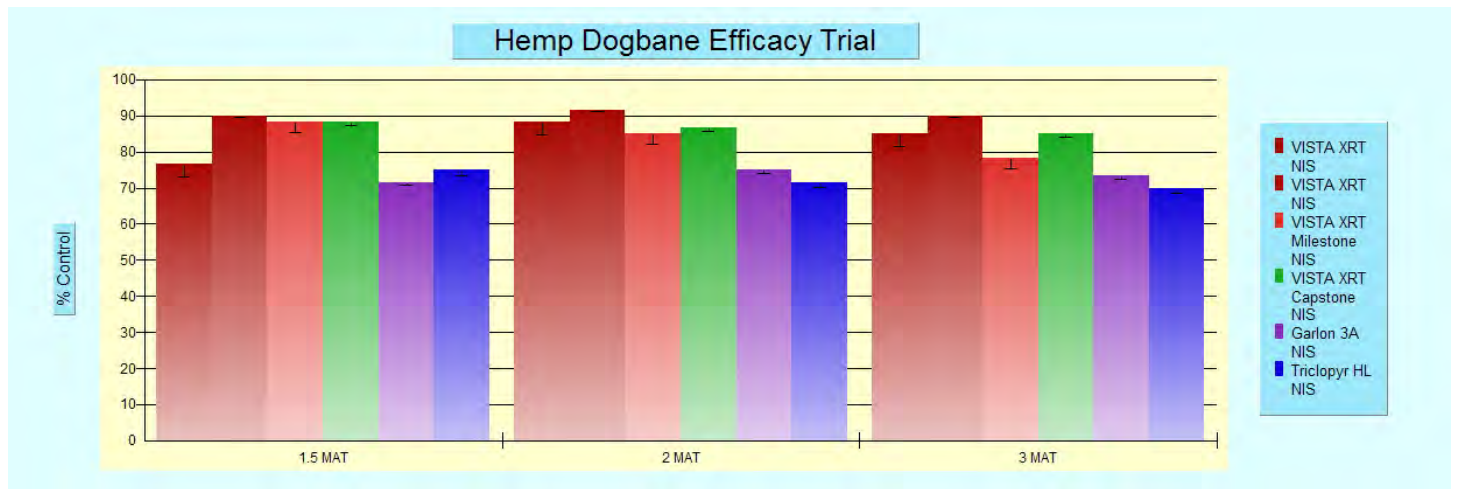
Protocol ID: NA14L1B012
 Location: Macon, MS

Trial ID: NA14L1B012
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Hemp dogbane		Poison-ivy	OVERALL	Hemp dogbane		Poison-ivy	OVERALL	Hemp dogbane		Poison-ivy
Crop Code											
BBCH Scale											
Crop Name				Overall				Overall			
Rating Date	7/11/14		7/11/14	8/1/14	8/1/14		8/1/14	8/11/14	8/11/14		8/11/14
Rating Data Type	CONTRO		CONTRO	GROUND	CONTRO		CONTRO	GROUND	CONTRO		CONTRO
Rating Unit	%		%	%	%		%	%	%		%
Trt No.	Treatment Name	Rate	Unit	9	10	11	12	13	14	15	16
1	VISTA XRT NIS	8 fl oz/a		88.3 a	100.0 a				93.3 a	85.0 a	100.0 a
		0.25 % v/v									
2	VISTA XRT NIS	12 fl oz/a		91.7 a	98.3 a				93.3 a	90.0 a	98.3 a
		0.25 % v/v									
3	VISTA XRT Milestone NIS	12 fl oz/a		85.0 a	100.0 a				91.7 a	78.3 a	93.3 a
		7 fl oz/a									
		0.25 % v/v									
4	VISTA XRT Capstone NIS	12 fl oz/a		86.7 a	100.0 a				93.3 a	85.0 a	100.0 a
		6 pt/a									
		0.25 % v/v									
5	Garlon 3A NIS	32 fl oz/a		75.0 a	81.7 a				91.7 a	73.3 a	81.7 a
		0.25 % v/v									
6	Triclopyr HL NIS	24 fl oz/a		71.7 a	80.0 a				91.7 a	70.0 a	83.3 a
		0.25 % v/v									
14	Untreated Check			0.0	0.0	96.7	0.0	0.0	96.7 a	0.0	0.0
LSD (P=Various)				32.44	28.91	.	.	.	4.95	25.92	28.75
Standard Deviation				17.83	15.89	.	.	.	2.78	14.25	15.80
CV				21.47	17.03	.	.	.	2.99	17.75	17.03
Bartlett's X2				9.862	6.731	.	.	.	1.909	11.387	7.094
P(Bartlett's X2)				0.079	0.035*	.	.	.	0.928	0.044*	0.069
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				1.079	2.789				4.769	1.238	1.941
Replicate Prob(F)				0.3766	0.1090				0.0299	0.3308	0.1940
Treatment F				0.591	1.122				1.231	0.877	0.836
Treatment Prob(F)				0.7076	0.4082				0.3564	0.5299	0.5528

Means followed by same letter do not differ significantly.

Chart 56. Hemp dogbane (*Apocynum cannabinum*) control at 1.5, 2, and 3 MAT (differences are not significant at $p \leq 0.05$).



2014 MS DOT Hemp Dogbane Efficacy Trial
Application B

Protocol ID: NA14L1B012
Location: Macon, MS

Trial ID: NA14L1B012
Study Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Trial Location

City: Macon
State/Prov.: MS

Trial Status: Completed
Trial Reliability: _____

Conducted Under GLP:
Conducted Under GEP: X

Official Trial Code: _____
Other Trial Code: _____

Results and Discussion

Objectives:

This study was initiated to evaluate fluroxypyr (Vista XRT) activity on hemp dogbane (*Apocynum cannabinum*) due to concerns with potential triclopyr volatility near crops. Two applications (A and B) were applied at late maturity. In Application B (discussed here), hemp dogbane was at full flowering and plants were at mature height. The study site had good cover at 0 DAT and dominated with hemp dogbane and poison-ivy (*Toxicodendron radicans*).

Results:

Overall Cover. Overall cover was less in treated plots compared to untreated, a reflection of control activity. However, differences were not significant at any month during the study, unlike Application A. By 3 MAT, cover in some treatments was very similar to the untreated.

Control. Similar to Application A, all treatments had activity on both species, but better activity on poison-ivy. Although higher Vista XRT rates tends to perform better, in general, combination treatments containing Vista XRT had the highest control, although not significant (Chart 57, hemp dogbane). Thus a combination like Vista XRT and Milestone, which would not contain triclopyr, would yield similar or better control of hemp dogbane. A similar pattern was observed at 2 and 3 MAT, in which differences were also not significant.

Conclusions: All herbicides had activity on both species. Higher rates of Vista XRT and particularly combination treatments containing Vista XRT had better control in general, but were not significantly better. Based upon the conditions of this study, Vista XRT should provide similar or better control of hemp dogbane and provide a viable alternative where triclopyr use may be an issue.

Site and Design

Plot Width, Unit: 10
Plot Length, Unit: 30
Replications: 3

FT Site Type: _____
FT Tillage Type: _____
Study Design: Randomized Complete Block

2014 MS DOT Hemp Dogbane Efficacy Trial (Continued)

Application B

Protocol ID: NA14L1B012

Trial ID: NA14L1B012

Location: Macon, MS

Study Director: Victor Maddox

Investigator: John Byrd

Application Description

	A	B
Application Date:	5/12/14	6/2/14
Time of Day:	3 PM	1 PM
Application Method:	SPRAY	SPRAY
Application Timing:	POSPOS	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	V. Maddox	V. Maddox
Air Temperature, Unit:	86 F	75 F
% Relative Humidity:	50	60
Wind Velocity, Unit:	5 MPH	5 MPH
Wind Direction:	S	SE
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	80	60

Application Equipment

	A	B
Appl. Equipment:	CO2 Backpack	CO2 Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	3 FT	3 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Tank Mix (Y/N):	Y	Y

2014 MS DOT Hemp Dogbane Efficacy Trial (Continued)

Application B

Protocol ID: NA14L1B012

Trial ID: NA14L1B012

Location: Macon, MS

Study Director: Victor Maddox

Investigator: John Byrd

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
7	HERB	VISTA XRT	2.78	LBAE/GAL	EC	8	fl oz/a	B	5.0 ml/mx	107	210	302
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
8	HERB	VISTA XRT	2.78	LBAE/GAL	EC	12	fl oz/a	B	7.5 ml/mx	108	213	312
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
9	HERB	VISTA XRT	2.78	LBAE/GAL	EC	12	fl oz/a	B	7.5 ml/mx	109	206	308
	HERB	Milestone	2	LBAE/GAL	SL	7	fl oz/a	B	4.375 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
10	HERB	VISTA XRT	2.78	LBAE/GAL	EC	12	fl oz/a	B	7.5 ml/mx	110	201	311
	HERB	Capstone	1.1	LBAE/GAL	SL	6	pt/a	B	59.99 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
11	HERB	Capstone	1.1	LBAE/GAL	SL	8	pt/a	B	79.99 ml/mx	111	207	304
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
12	HERB	Garlon 3A	3	LBAE/GAL	SC	32	fl oz/a	B	20.0 ml/mx	112	202	301
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
13	HERB	Triclopyr HL	4	LBAE/GAL	SC	24	fl oz/a	B	15.0 ml/mx	113	208	305
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
14	CHK	Untreated Check								114	204	306

2014 MS DOT Hemp Dogbane Efficacy Trial (Continued)

Application B

Protocol ID: NA14L1B012

Trial ID: NA14L1B012

Location: Macon, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Hemp dogbane	Poison-ivy	Hemp dogbane	OVERALL	Hemp dogbane	Poison-ivy	OVERALL	OVERALL
Crop Code				Overall			Overall	Overall
BBCH Scale				5/12/14	7/2/14	7/2/14	7/2/14	7/11/14
Crop Name				GROUND	CONTRO	CONTRO	GROUND	GROUND
Rating Date	5/12/14	5/12/14	5/12/14	%	%	%	%	%
Rating Data Type	GROUND	GROUND	MATURI					
Rating Unit	%	%	%					
Trt Treatment								
No. Name	1	2	3	4	5	6	7	8
Rate								
Unit								
7 VISTA XRT	33.3	26.7	28.3	86.7	85.0 a	95.0 a	80.0 a	
NIS								
8 VISTA XRT	25.0	23.3	30.0	86.7	86.7 a	100.0 a	70.0 a	
NIS								
9 VISTA XRT	30.0	23.3	30.3	90.0	81.7 a	100.0 a	70.0 a	
Milestone								
NIS								
10 VISTA XRT	30.0	36.7	29.0	90.0	90.0 a	100.0 a	73.3 a	
Capstone								
NIS								
11 Capstone	36.7	40.0	32.0	86.7	81.7 a	100.0 a	66.7 a	
NIS								
12 Garlon 3A	35.0	43.3	35.0	86.7	75.0 a	97.5 a	73.3 a	
NIS								
13 Triclopyr HL	31.7	30.0	33.3	90.0	73.3 a	72.5 a	80.0 a	
NIS								
14 Untreated Check	31.7	33.3	33.3	90.0	0.0	0.0	96.7 a	95.0
LSD (P=Various)	18.48	19.81	4.83	6.76	15.71	29.91	22.56	.
Standard Deviation	10.55	11.31	2.76	3.86	8.83	12.22	12.88	.
CV	33.32	35.26	8.77	4.37	10.78	12.87	16.89	.
Bartlett's X2	3.415	0.972	0.046	0.0	4.763	3.803	7.792	.
P(Bartlett's X2)	0.844	0.995	1.00	1.00	0.575	0.149	0.351	.
Mean Sep. Test					LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	0.037	48.479	2484.737	1.960	17.511	1.195	24.993	
Replicate Prob(F)	0.9634	0.0001	0.0001	0.1776	0.0003	0.3162	0.0001	
Treatment F	0.342	1.335	2.204	0.640	1.405	1.367	1.632	
Treatment Prob(F)	0.9207	0.3049	0.0987	0.7167	0.2897	0.3571	0.2060	

Means followed by same letter do not differ significantly.

2014 MS DOT Hemp Dogbane Efficacy Trial (Continued)

Application B

Protocol ID: NA14L1B012

Trial ID: NA14L1B012

Location: Macon, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Hemp dogbane		Poison-ivy	OVERALL	Hemp dogbane		Poison-ivy	OVERALL	Hemp dogbane		Poison-ivy
Crop Code											
BBCH Scale											
Crop Name				Overall				Overall			
Rating Date	7/11/14		7/11/14	8/1/14	8/1/14		8/1/14	8/11/14	8/11/14		8/11/14
Rating Data Type	CONTRO		CONTRO	GROUND	CONTRO		CONTRO	GROUND	CONTRO		CONTRO
Rating Unit	%		%	%	%		%	%	%		%
Trt No.	Treatment Name	Rate	Unit	9	10	11	12	13	14	15	16
7	VISTA XRT NIS	8 fl oz/a 0.25 % v/v				86.7 a	91.7 a	95.0 a			
8	VISTA XRT NIS	12 fl oz/a 0.25 % v/v				86.7 a	95.0 a	100.0 a			
9	VISTA XRT Milestone NIS	12 fl oz/a 7 fl oz/a 0.25 % v/v				73.3 a	98.3 a	100.0 a			
10	VISTA XRT Capstone NIS	12 fl oz/a 6 pt/a 0.25 % v/v				80.0 a	98.3 a	100.0 a			
11	Capstone NIS	8 pt/a 0.25 % v/v				70.0 a	95.0 a	100.0 a			
12	Garlon 3A NIS	32 fl oz/a 0.25 % v/v				76.7 a	93.3 a	97.5 a			
13	Triclopyr HL NIS	24 fl oz/a 0.25 % v/v				85.0 a	96.7 a	72.5 a			
14	Untreated Check			0.0	0.0	96.7 a	0.0	0.0	96.7	0.0	0.0
LSD (P=Various)						19.06	6.49	29.91			
Standard Deviation						10.88	3.65	12.22			
CV						13.29	3.82	12.87			
Bartlett's X2						11.405	6.252	3.803			
P(Bartlett's X2)						0.122	0.282	0.149			
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F						8.337	6.537	1.195			
Replicate Prob(F)						0.0041	0.0120	0.3162			
Treatment F						1.878	1.403	1.367			
Treatment Prob(F)						0.1494	0.2903	0.3571			

Means followed by same letter do not differ significantly.

**2014 MS DOT Hemp Dogbane Efficacy Trial (Continued)
Application B**

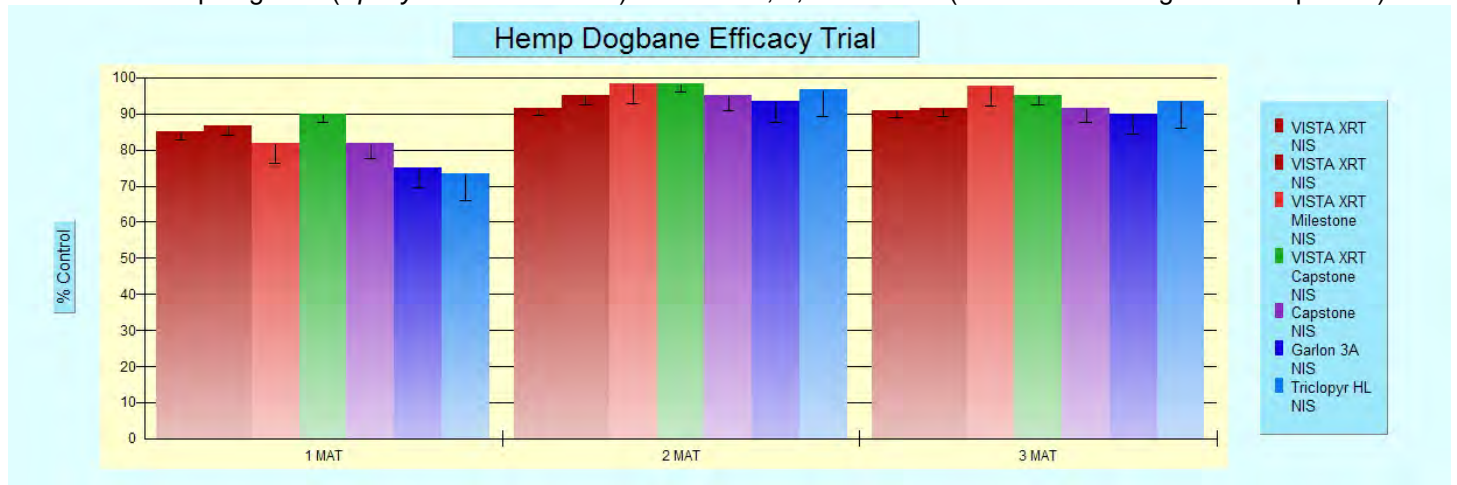
Protocol ID: NA14L1B012
Location: Macon, MS

Trial ID: NA14L1B012
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name				OVERALL	Hemp dogbane	Poison-ivy
Crop Code					Overall	9/1/14	9/1/14
BBCH Scale				9/1/14	9/1/14	9/1/14
Crop Name				GROUND	CONTRO	CONTRO
Rating Date				%	%	%
Rating Data Type						
Rating Unit						
Trt No.	Treatment Name	Rate	Unit	17	18	19
7	VISTA XRT NIS	8 fl oz/a	0.25 % v/v	91.7 a	91.0 a	95.0 a
8	VISTA XRT NIS	12 fl oz/a	0.25 % v/v	93.3 a	91.7 a	100.0 a
9	VISTA XRT Milestone NIS	12 fl oz/a	7 fl oz/a	80.0 a	97.7 a	100.0 a
10	VISTA XRT Capstone NIS	12 fl oz/a	6 pt/a	83.3 a	95.0 a	100.0 a
11	Capstone NIS	8 pt/a	0.25 % v/v	78.3 a	91.7 a	100.0 a
12	Garlon 3A NIS	32 fl oz/a	0.25 % v/v	80.0 a	90.0 a	95.0 a
13	Triclopyr HL NIS	24 fl oz/a	0.25 % v/v	86.7 a	93.3 a	72.5 a
14	Untreated Check			93.3 a	0.0	0.0
LSD (P=Various)				17.77	7.26	31.08
Standard Deviation				10.15	4.08	12.70
CV				11.82	4.39	13.42
Bartlett's X2				15.842	6.769	2.665
P(Bartlett's X2)				0.027*	0.343	0.264
Mean Sep. Test				LSD.05	LSD.05	LSD.05
Replicate F				8.780	10.460	0.897
Replicate Prob(F)				0.0034	0.0023	0.3802
Treatment F				1.156	1.271	1.251
Treatment Prob(F)				0.3854	0.3396	0.3964

Means followed by same letter do not differ significantly.

Chart 57. Hemp dogbane (*Apocynum cannabinum*) control at 1, 2, and 3 MAT (differences not significant at $p \leq 0.05$).



Valent IVM Weed Control SE Markets

Protocol ID: VUSA2013V10336PRO1.01 Trial ID: VUSA2013V10336PRO1.01
 Location: Starkville, MS Study Director: Victor Maddox
 Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox **Title:** _____
Investigator: John Byrd **Title:** _____

Trial Location

City: Starkville **Trial Status:** Completed
Directions: Mississippi State University Plant Science Research Center (North Farm).

Conducted Under GLP: **Official Trial Code:** _____
Conducted Under GEP: X **Other Trial Code:** _____

Results and Discussion

Objectives:

The objective of the study was to evaluate the efficacy of Piper on southern crabgrass (*Digitaria ciliaris*), a warm-season annual weed, in unimproved bermudagrass (*Cynodon dactylon*) turf.

Results:

Cover. Cover was similar across the study site at 0 DAT. By 28 DAT, cover was reduced and this continued reduction was significant by 43 DAT and remained significant until 107 DAT. Overall (not just green) cover at 1 YAT, illustrates the influence of increase dormant bermudagrass cover on winter weeds.

Bermudagrass Response. Bermudagrass cover was low at 28 DAT, ranging from 23 to 5 percent on average. Increased cover was observed at 43 DAT, but differences were not significant. By 70 DAT, a release pattern (15.7 to 30% cover in treated plots) was observed when compared to the untreated (6.7% cover). However, this pattern was not significant until 149 DAT. AT 1 YAT, plots treated with 10 oz. Piper had significantly more bermudagrass cover.

Southern Crabgrass Response. Crabgrass cover was 0 percent in treated plots at 43 DAT compared to 61.7 percent in the untreated. At 70 DAT, treatments with higher rates of Piper were better based upon control, but not significantly higher. However, differences were significant based upon crabgrass cover. Higher rates of Piper (10 oz/A) had the least amount of crabgrass cover, but were not significant compared to the 8 oz rate. In general, there was a decrease in cover and an increase in control as rate increased.

Annual Winter Weed Response (1 YAT). Significant cover differences of annual winter weeds was observed at 1 YAT. The untreated had significantly higher weed cover (63.3%) compared to treated plots, but not significantly higher than the 8 oz rate of Piper with glyphosate and Milestone. The 10 oz Piper treatment and the glyphosate plus Milestone plus SFM-75 treatment had the lowest weed cover. This illustrates the long effect of herbicide treatments on weed cover, which is likely more a reflection of weed-turf interactions than herbicide residual at 1 YAT.

Overall Conclusions:

Piper showed increasing activity upon southern crabgrass as rate increased. Although control of crabgrass was not significant during the study, herbicide influence upon cover was significant. This influence upon crabgrass appeared to significantly release bermudagrass, further illustrating the importance of managing unimproved bermudagrass turf by controlling crabgrass. This denser bermudagrass turf (overall cover at 1 YAT) in-turn seems to suppress winter weeds up to 1 year after the herbicide treatment, an important consideration when managing unimproved bermudagrass.

Site and Design

Plot Width, Unit: 10 FT **Site Type:** _____
Plot Length, Unit: 20 FT **Tillage Type:** _____
Replications: 3 **Study Design:** Randomized Complete Block

Valent IVM Weed Control SE Markets - Crabgrass (Continued)

Protocol ID: VUSA2013V10336PRO1.01
 Location: Starkville, MS

Trial ID: VUSA2013V10336PRO1.01
 Study Director: Victor Maddox
 Investigator: John Byrd

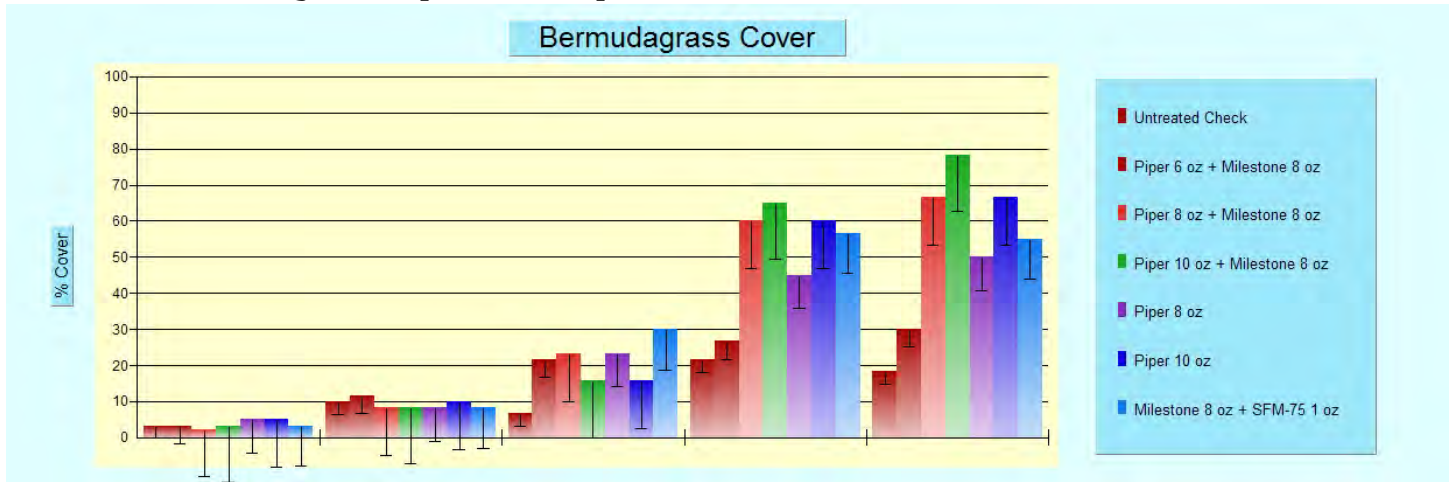
Application Description

	A
Application Date:	4/9/14
Time of Day:	2:00 PM
Application Method:	SPRAY
Application Timing:	N CPRPE
Application Placement:	FOLIAR
Applied By:	V Maddox
Air Temperature, Unit:	65 F
% Relative Humidity:	70
Wind Velocity, Unit:	3 MPH
Wind Direction:	NE
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	5

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	2 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	40 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Chart 58. Bermudagrass (*Cynodon dactylon*) Cover at 28, 43, 70, 107, and 149 DAT.



Valent IVM Weed Control SE Markets - Crabgrass (Continued)

Protocol ID: VUSA2013V10336PRO1.01
 Location: Starkville, MS

Trial ID: VUSA2013V10336PRO1.01
 Study Director: Victor Maddox
 Investigator: John Byrd

Reps: 3 Plots: 10 by 20 feet
 Spray vol: 40 gal/ac Mix size: 2 liters (min 2.0856)

Trt No.	Treatment Type	Form Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt to Measure	Product	Plot No. 1	By Rep 2	Rep 3
1	CHK	Untreated Check						A			101	203	306
2	HERB	Glyphosate 41	4	LBA/GAL	SL	38	fl oz/a	A	14.84	ml/mx	102	207	302
	HERB	Piper	76	%W/W	WG	6	oz wt/a	A	2.247	g/mx			
	HERB	Milestone	2	LB/GAL	SL	8	fl oz/a	A	3.125	ml/mx			
3	HERB	Glyphosate 41	4	LBA/GAL	SL	38	fl oz/a	A	14.84	ml/mx	103	202	304
	HERB	Piper	76	%W/W	WG	8	oz wt/a	A	2.996	g/mx			
	HERB	Milestone	2	LB/GAL	SL	8	fl oz/a	A	3.125	ml/mx			
4	HERB	Glytphosate 41	4	LBA/GAL	SL	38	fl oz/a	A	14.84	ml/mx	104	206	303
	HERB	Piper	76	%W/W	WG	10	oz wt/a	A	3.745	g/mx			
	HERB	Milestone	2	LB/GAL	SL	8	fl oz/a	A	3.125	ml/mx			
5	HERB	Glyphosate 41	4	LBA/GAL	SL	38	fl oz/a	A	14.84	ml/mx	105	204	305
	HERB	Piper	76	%W/W	WG	8	oz wt/a	A	2.996	g/mx			
6	HERB	Glyphosate 41	4	LBA/GAL	SL	38	fl oz/a	A	14.84	ml/mx	106	205	301
	HERB	Piper	76	%W/W	WG	10	oz wt/a	A	3.745	g/mx			
7	HERB	Glyphosate 41	4	LBA/GAL	SL	38	fl oz/a	A	14.84	ml/mx	107	201	307
	HERB	Milestone	2	LB/GAL	SL	8	fl oz/a	A	3.125	ml/mx			
	HERB	SFM-75	75	%W/W	WG	1	oz wt/a	A	0.3745	g/mx			

Pest Name	Overall	Overall	CYNDA BGRM Bermuda gra> 5/7/14	Overall 5/22/14	CYNDA BGRM Bermuda gra> 5/22/14	Crabgrass 5/22/14	Overall 6/18/14	CYNDA BGRM Bermuda gra> 6/18/14			
Rating Date	4/9/14	5/7/14	5/7/14	5/22/14	5/22/14	5/22/14	6/18/14	6/18/14			
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Unit	%	%	%	%	%	%	%	%			
Trt No.	Treatment Name	Rate	Rate Unit	1	2	3	4	5	6	7	8
1	Untreated Check			60.0	26.7 a	3.3 a	80.0 a	10.0 a	61.7 a	83.3 a	6.7 a
2	Glyphosate 41	38	fl oz/a	56.7	3.3 a	3.3 a	11.7 bc	11.7 a	0.0 b	38.3 b	21.7 a
	Piper	6	oz wt/a								
	Milestone	8	fl oz/a								
3	Glyphosate 41	38	fl oz/a	60.0	3.3 a	2.3 a	11.7 bc	8.3 a	0.0 b	38.3 b	23.3 a
	Piper	8	oz wt/a								
	Milestone	8	fl oz/a								
4	Glytphosate 41	38	fl oz/a	60.0	3.3 a	3.3 a	8.3 c	8.3 a	0.0 b	18.3 b	15.7 a
	Piper	10	oz wt/a								
	Milestone	8	fl oz/a								
5	Glyphosate 41	38	fl oz/a	60.0	7.7 a	5.0 a	18.3 b	8.3 a	0.0 b	50.0 b	23.3 a
	Piper	8	oz wt/a								
6	Glyphosate 41	38	fl oz/a	60.0	6.0 a	5.0 a	18.3 b	10.0 a	0.0 b	30.0 b	15.7 a
	Piper	10	oz wt/a								
7	Glyphosate 41	38	fl oz/a	60.0	3.3 a	3.3 a	8.3 c	8.3 a	0.0 b	38.3 b	30.0 a
	Milestone	8	fl oz/a								
	SFM-75	1	oz wt/a								
LSD (P=Various)				3.88	31.24	5.15	9.07	5.77	1.94	33.24	25.86
Standard Deviation				2.18	17.56	2.89	5.10	3.24	1.09	18.68	14.54
CV				3.67	229.0	78.88	22.78	34.92	12.39	44.08	74.64
Bartlett's X2				0.0	36.25	1.949	3.931	1.102	0.0	6.055	9.771
P(Bartlett's X2)				.	0.001*	0.745	0.559	0.954	.	0.417	0.135
Mean Sep. Test					LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				1.000	1.060	1.731	0.733	0.340	1.000	0.351	0.133
Replicate Prob(F)				0.3966	0.3769	0.2186	0.5009	0.7187	0.3966	0.7108	0.8770
Treatment F				1.000	0.712	0.345	76.504	0.491	1369.000	3.604	0.801
Treatment Prob(F)				0.4682	0.6471	0.8994	0.0001	0.8036	0.0001	0.0280	0.5877

Means followed by same letter do not differ significantly.

Valent IVM Weed Control SE Markets - Crabgrass (Continued)

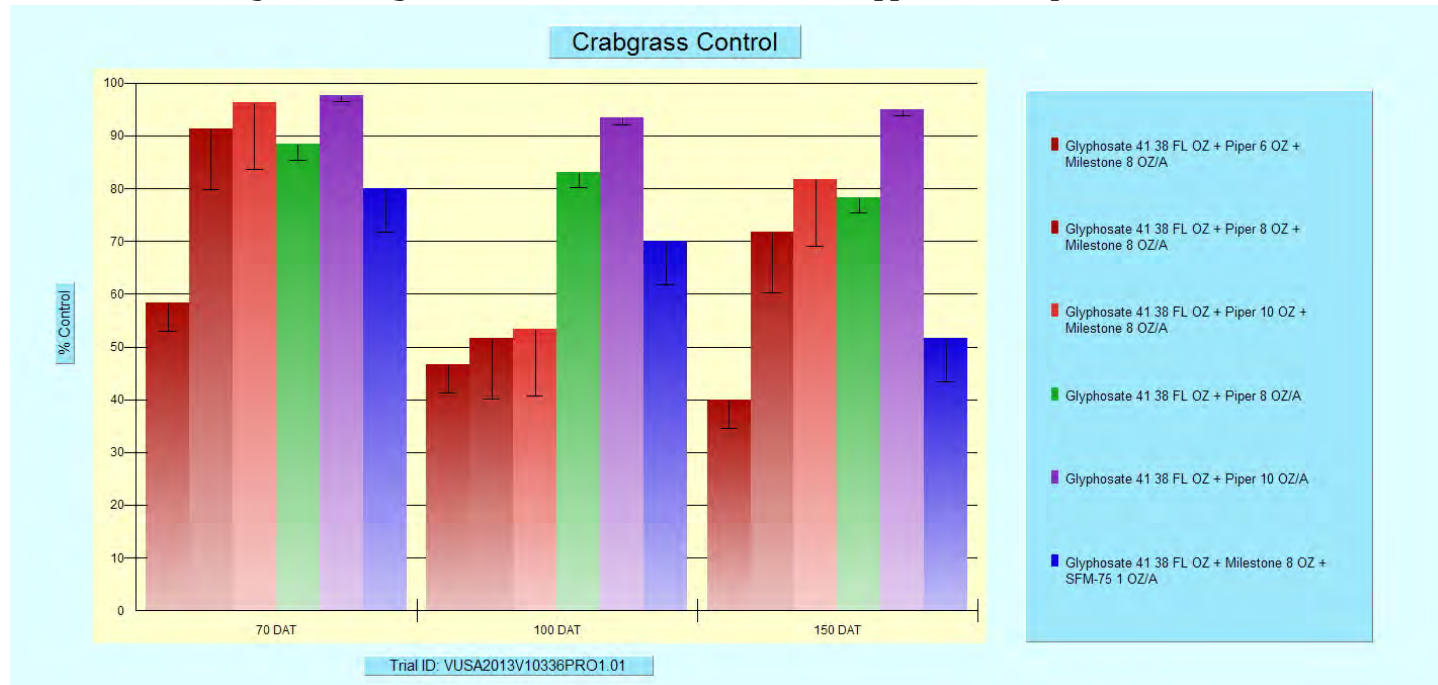
Protocol ID: VUSA2013V10336PRO1.01
Location: Starkville, MS

Trial ID: VUSA2013V10336PRO1.01
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name	Crabgrass	Crabgrass	Overall	CYNDA BGRM Bermuda gra> 7/25/14 GROUND %	Crabgrass	Crabgrass	Overall	CYNDA BGRM Bermuda gra> 9/5/14 GROUND %
Crop Code	6/18/14	6/18/14	7/25/14		7/25/14	7/25/14	9/5/14	
BBCH Scale	CONTRO	GROUND	GROUND		GROUND	CONTRO	GROUND	
Crop Name	%	%	%	%	%	%	%	%
Rating Date								
Rating Data Type								
Rating Unit								
Trt Treatment	9	10	11	12	13	14	15	16
No. Name Rate Unit								
1 Untreated Check	0.0	65.0 a	80.0 a	21.7 a	68.3 a	31.7	80.0 a	18.3 c
2 Glyphosate 41 38 fl oz/a Piper 6 oz wt/a Milestone 8 fl oz/a	58.3 a	16.7 b	78.3 a	26.7 a	43.3 ab	46.7 a	86.7 a	30.0 bc
3 Glyphosate 41 38 fl oz/a Piper 8 oz wt/a Milestone 8 fl oz/a	91.3 a	3.0 bc	75.0 a	60.0 a	13.3 c	51.7 a	86.7 a	66.7 ab
4 Glyphosate 41 38 fl oz/a Piper 10 oz wt/a Milestone 8 fl oz/a	96.3 a	1.7 c	76.7 a	65.0 a	11.7 c	53.3 a	90.0 a	78.3 a
5 Glyphosate 41 38 fl oz/a Piper 8 oz wt/a	88.3 a	3.7 bc	76.7 a	45.0 a	13.3 c	83.0 a	83.3 a	50.0 abc
6 Glyphosate 41 38 fl oz/a Piper 10 oz wt/a	97.7 a	1.0 c	75.0 a	60.0 a	3.7 c	93.3 a	86.7 a	66.7 ab
7 Glyphosate 41 38 fl oz/a Milestone 8 fl oz/a SFM-75 1 oz wt/a	80.0 a	5.0 bc	83.3 a	56.7 a	21.7 bc	70.0 a	91.7 a	55.0 abc
LSD (P=Various)	37.32	13.78	21.89	37.01	28.60	50.38	18.04	36.89
Standard Deviation	20.52	7.74	12.30	20.80	16.07	27.69	10.14	20.74
CV	24.04	56.47	15.8	43.47	64.17	41.75	11.73	39.77
Bartlett's X2	20.159	23.056	2.243	6.149	14.917	9.883	4.688	7.797
P(Bartlett's X2)	0.001*	0.001*	0.815	0.407	0.021*	0.079	0.455	0.253
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	0.768	1.303	0.165	1.048	0.697	3.542	0.243	1.055
Replicate Prob(F)	0.4896	0.3076	0.8497	0.3806	0.5172	0.0687	0.7879	0.3784
Treatment F	1.533	26.989	0.178	2.091	6.057	1.401	0.444	3.203
Treatment Prob(F)	0.2639	0.0001	0.9776	0.1304	0.0041	0.3032	0.8358	0.0408

Means followed by same letter do not differ significantly.

Chart 59. Crabgrass (*Digitaria ciliaris*) Control at Approximately 70, 100, and 150 DAT.



Valent IVM Weed Control SE Markets - Crabgrass (Continued)

Protocol ID: VUSA2013V10336PRO1.01

Trial ID: VUSA2013V10336PRO1.01

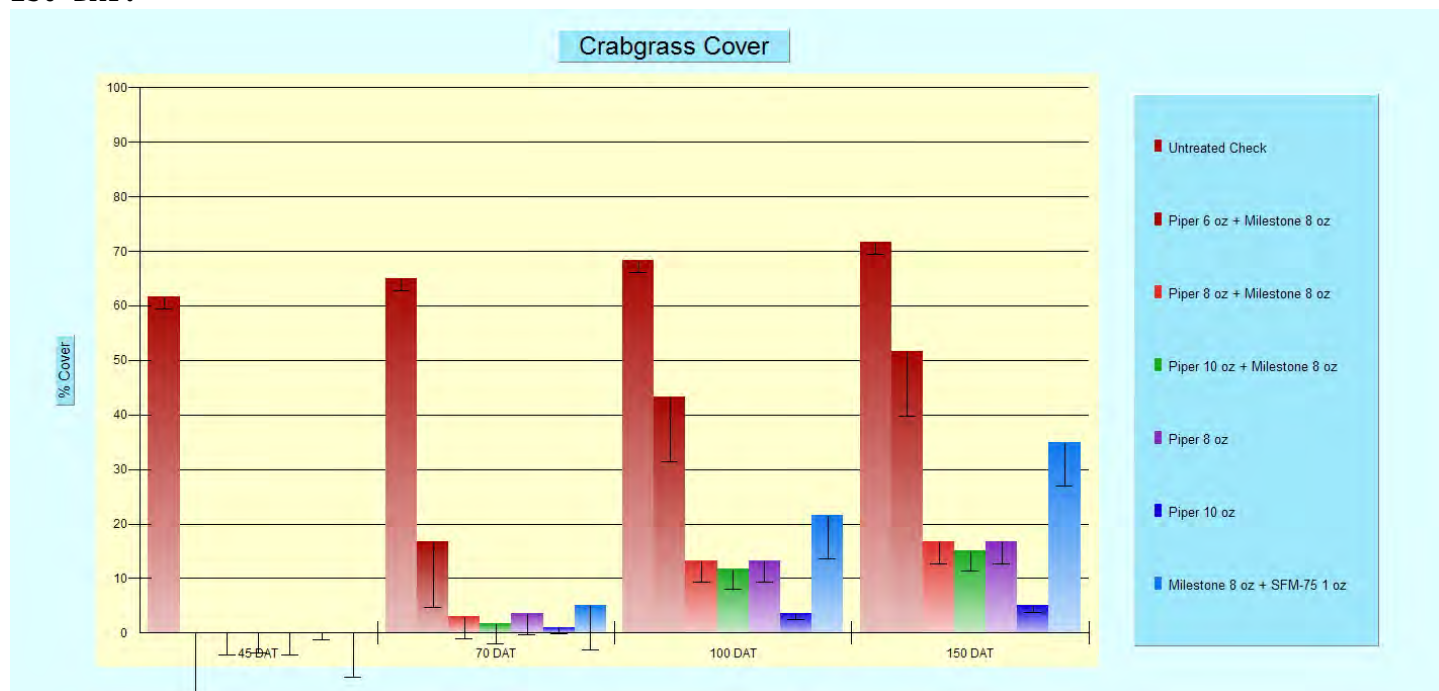
Location: Starkville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Crabgrass	Crabgrass	Annual wint>	Overall	CYNDA BGRM Bermuda gra>		
Crop Code							
BBCH Scale							
Crop Name							
Rating Date	9/5/14	9/5/14	4/9/15	4/9/15	4/9/15		
Rating Data Type	GROUND	CONTRO	GROUND	GROUND	GROUND		
Rating Unit	%	%	%AREA	%AREA	%AREA		
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate	
		Unit	Unit	Unit	Unit	Unit	
		17	18	19	20	21	
1	Untreated Check	71.7 a	0.0	63.3 a	66.7 c	5.0 d	
2	Glyphosate 41 Piper Milestone	38 fl oz/a 6 oz wt/a 8 fl oz/a	51.7 ab	40.0 a	56.7 ab	76.7 b	23.3 c
3	Glyphosate 41 Piper Milestone	38 fl oz/a 8 oz wt/a 8 fl oz/a	16.7 cd	71.7 a	50.0 abc	85.0 ab	36.7 bc
4	Glytphosate 41 Piper Milestone	38 fl oz/a 10 oz wt/a 8 fl oz/a	15.0 cd	81.7 a	36.7 c	91.7 a	63.3 a
5	Glyphosate 41 Piper	38 fl oz/a 8 oz wt/a	16.7 cd	78.3 a	46.7 bc	80.0 b	40.0 b
6	Glyphosate 41 Piper	38 fl oz/a 10 oz wt/a	5.0 d	95.0 a	35.0 c	90.0 a	66.7 a
7	Glyphosate 41 Milestone SFM-75	38 fl oz/a 8 fl oz/a 1 oz wt/a	35.0 bc	51.7 a	36.7 c	60.0 c	30.0 bc
LSD (P=Various)		29.44	36.52	16.51	9.41	16.09	
Standard Deviation		16.55	20.08	9.28	5.29	9.04	
CV		54.72	28.79	19.99	6.73	23.88	
Bartlett's X2		14.481	6.311	3.571	3.939	1.002	
P(Bartlett's X2)		0.013*	0.177	0.734	0.268	0.909	
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	
Replicate F		1.335	1.037	2.032	4.723	0.524	
Replicate Prob(F)		0.2996	0.3896	0.1737	0.0307	0.6049	
Treatment F		6.274	3.080	4.207	14.936	17.354	
Treatment Prob(F)		0.0035	0.0613	0.0165	0.0001	0.0001	

Means followed by same letter do not differ significantly.

Chart 60. Southern Crabgrass (*Digitaria ciliaris*) Control at Approximately 45, 70, 100, and 150 DAT.

Japanese climbing fern control on MS rights-of-way

Protocol ID:	Trial ID:
Location: Poplarville, MS	Study Director: Victor Maddox
	Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox	Title: _____
Investigator: John Byrd	Title: _____

Trial Location

City: Poplarville	Trial Status: <u> </u> Completed <u> </u>
State/Prov.: MS	Trial Reliability: _____

Directions:

Hwy 53 East of Poplarville, East of I-59. North side of Hwy 53 along fence line.

Conducted Under GLP: <u> </u>	Official Trial Code: _____
Conducted Under GEP: X	Other Trial Code: _____

Results and Conclusions

Objectives:

The objectives of this study were to evaluate the efficacy of various herbicides on Japanese climbing fern (*Lygodium japonicum*) and little bluestem (*Schizachyrium scoparium*) tolerance to these herbicides. Little bluestem is a native grass and this study was presented at the Natural Areas Association Conference.

Results:

Overall Cover. Overall cover was 90 percent across all plots at initiation on August 8, 2014 (0 DAT). Most of the cover was Japanese climbing fern (JCF) ranging from 46.7 to 70 percent cover. Differences in JCF were not significant at 0 DAT. The primary turf species was little bluestem with 23.3 to 38.3 percent cover on average at 0 DAT. Again, differences were not significant at 0 DAT. Significant losses in cover were observed at 7 DAT, particularly in plots treated with MSMA (10% cover), Accord XRT (70% cover), and Garlon 4 (66.7% cover) compared to other treatments. The pattern was similar at 14 DAT, except loss in cover increased in Accord XRT treated plots (43.3% cover). Aside from Garlon 4 and MSMA, cover in all other plots were similar to the untreated. At 28 DAT, cover in only two treatments (Milestone at 90% and Oust at 83.3%) were similar to the untreated. MSMA had the lowest cover at 6.7 percent followed by Accord XRT at 26.7 percent. This trend continued at 59, 89, 269, and 364 DAT, except for a sharp increase in cover in MSMA treated plots.

Japanese Climbing Fern Response. At 7 DAT, MSMA had significantly more control (91.7%) compared to all other treatments (**Chart 61**). Garlon 4 was next (30%) followed by Accord XRT (5%). The remaining treatments showed no control at 7 DAT. A similar pattern remained at 14 DAT, but Plateau and Oust showed some control (1.7% each). By 28 DAT, JCF control in Garlon 4 plots was equal to MSMA on average (98.3%). Control with Perspective increased to 65%. All other treatments were less acceptable and ranged from 36.7 to 5 percent control. Except for Oust and MSMA, most control in most treatments increased by 59 DAT. At this date, control in Garlon 4 plots was 100 percent followed by Perspective at 78.3 percent on average. By 89 DAT, Perspective showed 85 percent control. In the spring (May 4, 2015) following the fall application, JCF occurred in very low or no presence in some plots despite minimal control the previous fall in some treatments. These treatments included Escort (96.7% control), Arsenal 2 (100% control), Plateau (100% control). Accord XRT and Perspective retained control over winter at 86.7 and 96.7, respectively. This is reflected in JCF cover ratings taken at 308 DAT. At this date, JCF cover in Oust, Milestone, and MSMA plots was not significantly lower than the untreated plots. Unfortunately, Garlon 4 which showed acceptable control during the fall, had 30 percent JCF cover the following spring. Although this may indicate a lack of residual, it was still significantly less JCF cover than the untreated. Accord XRT, Escort, Arsenal 2, Plateau, and Perspective had similar low cover of JCF at 308 DAT. This pattern remained through 364 DAT.

Japanese climbing fern control on MS rights-of-way (Continued)

Protocol ID: _____ Trial ID: _____
 Location: Poplarville, MS Study Director: Victor Maddox
 Investigator: John Byrd

Results and Conclusions (Continued)

Little Bluestem Response. At 7 DAT, Accord XRT and MSMA showed significantly more damage to little bluestem at 90 and 91.7 percent on average (**Chart 62**). Damage from Garlon 4 (6.7%) and Perspective (1.7%) was more tolerable. No damage was observed from the remaining treatments. A similar pattern remained at 14 DAT, but damage was higher at 96.7% control in Accord XRT and 93.3% control in MSMA treated plots. Damage from other herbicide treatments remained low. Damage from Accord XRT (100%) and MSMA (95%) was not acceptable at 28 DAT. The remaining treatments were not as damaging on little bluestem and ranged from 11.7 (Plateau) to 0 (Milestone) percent. By 59 DAT, Plateau damage had increased to 23.3 percent. However MSMA damage was 68.3, indicating that suppression was decreasing. Some treatments showed increases in damage by 59 DAT, but damage was minimal. This pattern was similar at 89, with increased damage in some treatments and decreased damage in other treatments. Damage was still evident in Accord XRT and MSMA treatments the following spring (May 4, 2015), although damage was minimal in most treatments. Little bluestem cover was actually higher in most treatments compared to the untreated check at 308 DAT. This is likely a result of a release from competing species such as JCF in some treatments. However, Garlon 4 had the highest little bluestem cover at 308 DAT, but 30 percent JCF cover. This pattern remained through 364 DAT.

Conclusions:

This study illustrates potential problems with treating invasive plant species with herbicides. Some herbicides will control a particular invasive plant, JCF in this study, but also control all other species as well. And there are varying degrees of control, both for the invasive plant and desirable plants. Products like Accord XRT (high rate), did more damage to desirable turf than the product did to JCF. In other cases, the herbicide had good early control, but may lack residual the following year. For example in this study, Garlon 4 showed positive results during the first years. However, JCF seemed to be recovering the following spring indicating a possible need for retreat the following year. Conversely, JCF control with Perspective was slow during the first year, yet had good control by the end of the season and very low JCF cover the following year. Other products, although less effective on JCF the first year, seemed to have some residual the following year. These factors should be taken into consideration when choosing a product to control JCF, or other invasive plants.

Plot Width, Unit: 10 FT Site Type: _____
 Plot Length, Unit: 30 FT Tillage Type: _____
 Replications: 3 Study Design: Randomized Complete Block

Application Description

	A
Application Date:	8/8/14
Time of Day:	12:15 PM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	92 F
% Relative Humidity:	60
Wind Velocity, Unit:	3 MPH
Wind Direction:	S
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	40

Japanese climbing fern control on MS rights-of-way (Continued)

Protocol ID:

Trial ID:

Location: Poplarville, MS

Study Director: Victor Maddox

Investigator: John Byrd

**Site and Design
Application Equipment**

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2
Tank Mix (Y/N):	Y

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Form Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Accord XRT	5.4	LB/GAL	SL	1	gal/a	A	79.99 ml/mx	101	202	307
2	HERB	Escort	60	%AW/W	WG	1	oz ai/a	A	0.9986 g/mx	102	207	301
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	HERB	Arsenal 2	2	LBA/GAL	SL	1	% v/v	A	20.0 ml/mx	103	209	305
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
4	HERB	Garlon 4	4	LBA/GAL	SL	4	% v/v	A	79.99 ml/mx	104	208	303
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
5	HERB	Plateau	2	LB/GAL	SL	1.5	% v/v	A	30.0 ml/mx	105	204	309
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
6	HERB	Oust	75	%AW/W	SG	1	oz ai/a	A	0.7988 g/mx	106	201	308
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
7	HERB	Perspective			WG	5	oz wt/a	A	2.996 g/mx	107	206	302
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
8	HERB	Milestone	2	LB/GAL	SL	7	fl oz/a	A	4.375 ml/mx	108	205	306
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
9	HERB	MSMA	6	LBA/GAL	SC	0.5	gal/a	A	40.0 ml/mx	109	203	304
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
10	CHK	Untreated Check						A		110	210	310

Japanese climbing fern control on MS rights-of-way (Continued)

Protocol ID:

Trial ID:

Location: Poplarville, MS

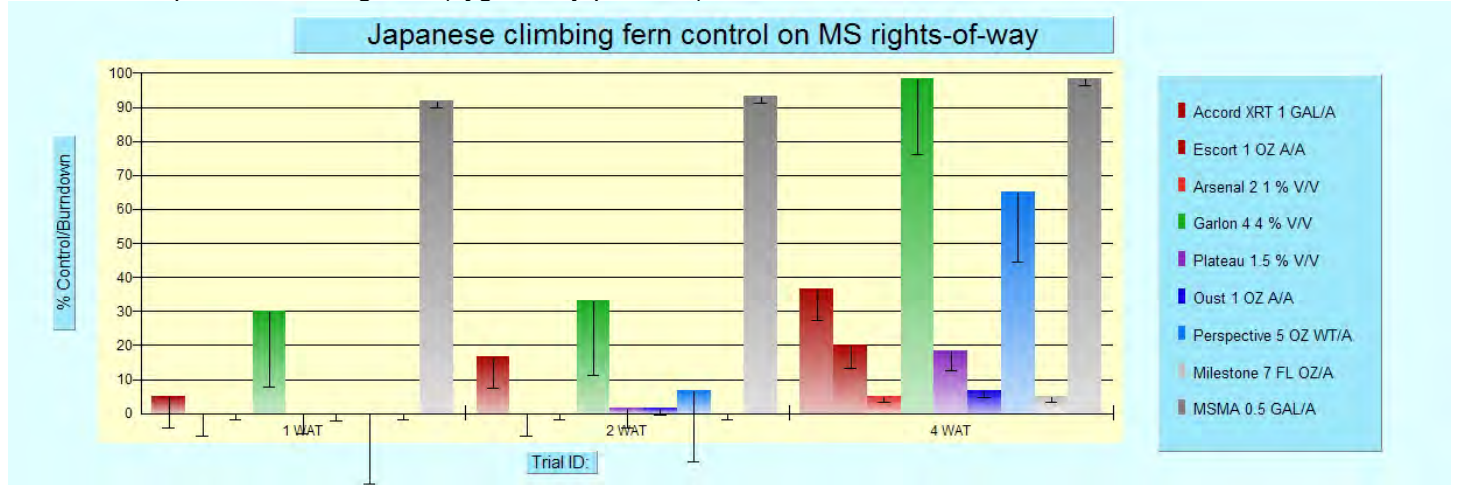
Study Director: Victor Maddox

Investigator: John Byrd

Crop Code		Japanese cl>	Little blue>	Japanese cl>	Little blue>		Japanese cl>	Little blue>			
BBCH Scale						Overall					
Crop Name		Overall	Overall	Overall	Overall	8/15/14	8/22/14	8/22/14			
Rating Date		8/8/14	8/8/14	8/8/14	8/15/14	8/15/14	8/15/14	8/22/14			
Rating Data Type		GROUND	GROUND	GROUND	CONTRO	CONTRO	GROUND	CONTRO			
Rating Unit		%AREA	%AREA	%AREA	%	%	%AREA	%			
Trt No.	Treatment Name	Rate	Unit	1	2	3	4	5	6	7	8
1	Accord XRT	1	gal/a	90.0 a	56.7 a	26.7 a	5.0 c	90.0 a	70.0 b	16.7 c	96.7 a
2	Escort NIS	1	oz ai/a	90.0 a	63.3 a	26.7 a	0.0 d	0.0 c	90.0 a	0.0 d	0.0 c
3	Arsenal 2 NIS	1	% v/v	90.0 a	50.0 a	36.7 a	0.0 d	0.0 c	90.0 a	0.0 d	0.0 c
4	Garlon 4 NIS	4	% v/v	86.7 a	60.0 a	30.0 a	30.0 b	6.7 b	66.7 b	33.3 b	8.3 b
5	Plateau NIS	1.5	% v/v	86.7 a	63.3 a	23.3 a	0.0 d	0.0 c	86.7 a	1.7 d	3.3 bc
6	Oust NIS	1	oz ai/a	86.7 a	46.7 a	36.7 a	0.0 d	0.0 c	86.7 a	1.7 d	0.0 c
7	Perspective NIS	5	oz wt/a	86.7 a	56.7 a	26.7 a	0.0 d	1.7 c	86.7 a	6.7 d	3.3 bc
8	Milestone NIS	7	fl oz/a	90.0 a	70.0 a	26.7 a	0.0 d	0.0 c	90.0 a	0.0 d	0.0 c
9	MSMA NIS	0.5	gal/a	90.0 a	46.7 a	38.3 a	91.7 a	91.7 a	10.0 c	93.3 a	93.3 a
10	Untreated Check			90.0 a	66.7 a	23.3 a	0.0	0.0	90.0 a	0.0	0.0
LSD (P=.05)				5.11	26.84	21.41	3.48	2.88	7.72	7.61	5.77
Standard Deviation				2.98	15.65	12.48	2.01	1.67	4.50	4.40	3.33
CV				3.36	26.98	42.32	14.3	7.89	5.87	25.81	14.63
Bartlett's X2				0.0	3.312	2.181	0.56	0.0	1.321	7.507	2.148
P(Bartlett's X2)				1.00	0.913	0.988	0.454	0.001*	0.933	0.186	0.708
Replicate F				6.000	3.799	1.749	0.229	1.000	3.740	2.347	0.250
Replicate Prob(F)				0.0101	0.0420	0.2023	0.7982	0.3897	0.0438	0.1277	0.7818
Treatment F				1.000	0.823	0.619	698.457	1692.750	92.055	146.240	454.875
Treatment Prob(F)				0.4742	0.6035	0.7664	0.0001	0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not differ significantly (P=.05, LSD).

Chart 61. Japanese Climbing Fern (*Lygodium japonicum*) Control at 1, 2, and 4 WAT.



Japanese climbing fern control on MS rights-of-way (Continued)

Protocol ID:

Trial ID:

Location: Poplarville, MS

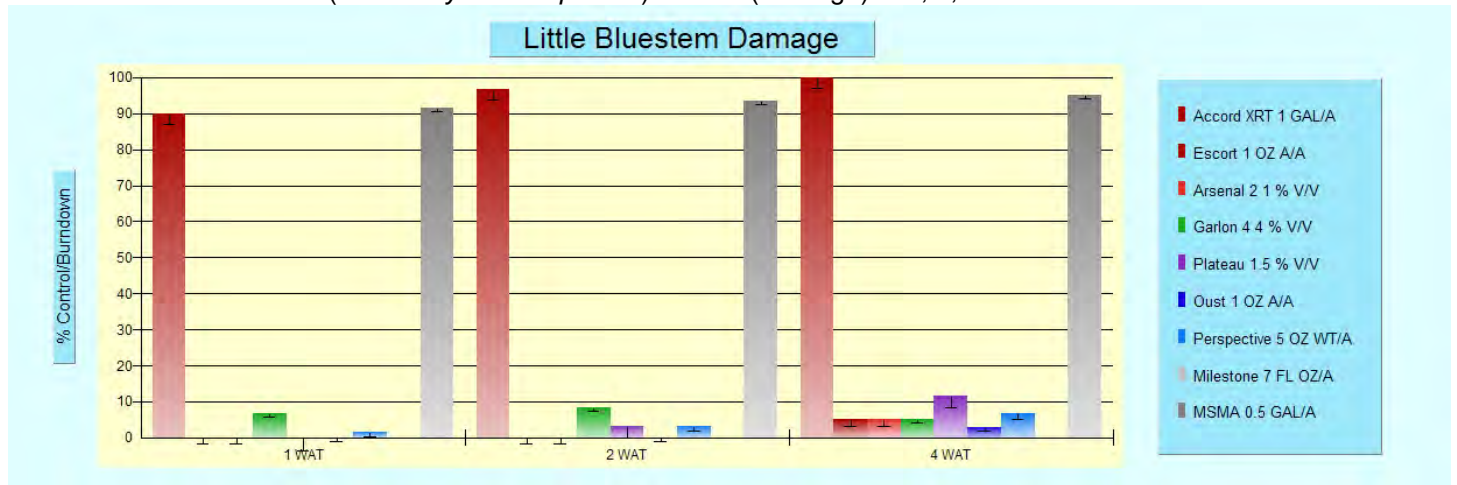
Study Director: Victor Maddox

Investigator: John Byrd

Pest Type		W Weed		W Weed		W Weed	W Weed				
Pest Code		LYFJA		ANOSC		LYFJA	ANOSC				
Pest Name		Japanese cl>		Little blue>		Japanese cl>	Little blue>				
Crop Name	Overall		Overall		Overall		Overall	Overall			
Rating Date	8/22/14	9/5/14	9/5/14	9/5/14	10/6/14	10/6/14	10/6/14	10/6/14	11/5/14		
Rating Data Type	GROUND	CONTRO	GROUND	CONTRO	GROUND	CONTRO	CONTRO	CONTRO	GROUND		
Rating Unit	%AREA	%	%AREA	%	%AREA	%	%	%	%AREA		
Days After First/Last Applic.	14 14	28 28	28 28	28 28	59 59	59 59	59 59	59 59	89 89		
Trt-Eval Interval	14 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A		
ARM Action Codes	L05	L05E	L05	L05E	L05	L05E	L05E	L05E	L05		
Trt No.	Treatment Name	Rate	Unit	9	10	11	12	13	14	15	16
1	Accord XRT	1 gal/a		43.3 c	36.7 c	26.7 e	100.0 a	25.0 f	50.0 c	100.0 a	25.0 f
2	Escort NIS	1 oz ai/a 0.25 % v/v		90.0 a	20.0 d	71.7 c	5.0 de	71.7 c	31.7 d	6.7 c	71.7 c
3	Arsenal 2 NIS	1 % v/v 0.25 % v/v		90.0 a	5.0 e	81.7 b	5.0 de	78.3 bc	5.0 f	6.7 c	78.3 bc
4	Garlon 4 NIS	4 % v/v 0.25 % v/v		63.3 b	98.3 a	45.0 d	5.0 de	50.0 e	100.0 a	5.0 c	50.0 e
5	Plateau NIS	1.5 % v/v 0.25 % v/v		83.3 a	18.3 d	76.7 bc	11.7 c	76.7 bc	18.3 e	23.3 c	76.7 bc
6	Oust NIS	1 oz ai/a 0.25 % v/v		86.7 a	6.7 e	83.3 ab	3.0 e	85.0 abc	3.3 f	3.0 c	85.0 abc
7	Perspective NIS	5 oz wt/a 0.25 % v/v		81.7 a	65.0 b	76.7 bc	6.7 d	70.0 cd	78.3 b	10.0 c	70.0 cd
8	Milestone NIS	7 fl oz/a 0.25 % v/v		90.0 a	5.0 e	90.0 a	0.0 f	90.0 ab	8.3 ef	0.0 c	90.0 ab
9	MSMA NIS	0.5 gal/a 0.25 % v/v		10.0 d	98.3 a	6.7 f	95.0 b	53.3 de	40.0 cd	68.3 b	53.3 de
10	Untreated Check			90.0 a	0.0	90.0 a	0.0	96.7 a	0.0	0.0	96.7 a
LSD (P=.05)				10.08	8.33	7.06	2.50	18.31	13.06	29.80	18.31
Standard Deviation				5.88	4.81	4.12	1.45	10.68	7.55	17.22	10.68
CV				8.07	12.26	6.35	5.63	15.32	20.27	69.49	15.32
Bartlett's X2				2.003	7.565	2.939	0.575	12.249	12.258	22.575	12.249
P(Bartlett's X2)				0.849	0.182	0.891	0.75	0.14	0.056	0.001*	0.14
Replicate F				0.169	0.280	0.344	1.398	0.139	0.634	0.050	0.139
Replicate Prob(F)				0.8459	0.7594	0.7133	0.2756	0.8712	0.5432	0.9515	0.8712
Treatment F				62.416	192.250	146.607	2391.190	12.149	60.659	12.538	12.149
Treatment Prob(F)				0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not differ significantly (P=.05, LSD).

Chart 62. Little Bluestem (*Schizachyrium scoparium*) Control (Damage) at 1, 2, and 4 WAT.



Japanese climbing fern control on MS rights-of-way (Continued)

Protocol ID:

Trial ID:

Location: Poplarville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Type	W Weed	W Weed		W Weed	W Weed	W Weed	W Weed	W Weed		
Pest Code	LYFJA	ANOSC		LYFJA	ANOSC	LYFJA	ANOSC	LYFJA	ANOSC	
Pest Name	Japanese cl>	Little blue>		Japanese cl>	Little blue>	Japanese cl>	Little blue>	Japanese cl>	Little blue>	
Crop Name			Overall						Overall	
Rating Date	11/5/14	11/5/14	5/4/15	5/4/15	5/4/15	6/12/15	6/12/15	6/12/15	8/7/15	
Rating Data Type	CONTRO	CONTRO	GROUND	CONTRO	CONTRO	GROUND	GROUND	GROUND	GROUND	
Rating Unit	%	%	%AREA	%	%	%AREA	%AREA	%AREA	%AREA	
Days After First/Last Applic.	89 89	89 89	269 269	269 269	269 269	308 308	308 308	308 308	364 364	
Trt-Eval Interval	28 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A	28 DA-A	
ARM Action Codes	L05E	L05E	L05	L05E	L05E	L05	L05	L05	L05	
Trt Treatment	Rate	Unit								
No. Name	Rate	Unit	17	18	19	20	21	22	23	24
1 Accord XRT	1 gal/a		53.3 b	100.0 a	50.0 b	86.7 a	93.3 a	3.3 d	0.0 c	53.3 d
2 Escort	1 oz ai/a		46.7 b	18.3 c	75.0 a	96.7 a	1.7 c	3.3 d	53.3 ab	81.7 abc
NIS	0.25 % v/v									
3 Arsenal 2	1 % v/v		16.7 c	16.7 c	71.7 a	100.0 a	10.0 c	1.7 d	58.3 ab	76.7 bc
NIS	0.25 % v/v									
4 Garlon 4	4 % v/v		95.0 a	0.0 c	80.0 a	18.3 b	3.3 c	30.0 bc	63.3 a	91.7 a
NIS	0.25 % v/v									
5 Plateau	1.5 % v/v		11.7 c	20.0 c	73.3 a	100.0 a	5.0 c	3.3 d	35.0 ab	70.0 c
NIS	0.25 % v/v									
6 Oust	1 oz ai/a		10.0 c	8.3 c	83.3 a	18.3 b	0.0 c	36.7 ab	50.0 ab	83.3 abc
NIS	0.25 % v/v									
7 Perspective	5 oz wt/a		85.0 a	3.3 c	73.3 a	96.7 a	8.3 c	5.0 cd	53.3 ab	86.7 ab
NIS	0.25 % v/v									
8 Milestone	7 fl oz/a		23.3 c	5.0 c	83.3 a	25.0 b	0.0 c	43.3 ab	40.0 ab	88.3 ab
NIS	0.25 % v/v									
9 MSMA	0.5 gal/a		16.7 c	55.0 b	80.0 a	33.3 b	31.7 b	53.3 ab	43.3 ab	76.7 bc
NIS	0.25 % v/v									
10 Untreated Check			0.0	0.0	76.7 a	0.0	0.0	60.0 a	30.0 bc	90.0 ab
LSD (P=.05)			16.40	24.89	14.96	38.30	13.79	25.96	30.21	14.48
Standard Deviation			9.48	14.38	8.72	22.13	7.96	15.13	17.61	8.44
CV			23.8	57.1	11.68	34.63	46.75	63.05	41.27	10.57
Bartlett's X2			3.84	19.141	6.856	11.106	9.0	15.883	3.135	9.189
P(Bartlett's X2)			0.798	0.004*	0.444	0.085	0.174	0.069	0.926	0.42
Replicate F			0.072	0.501	0.866	4.409	1.328	0.207	11.370	3.523
Replicate Prob(F)			0.9307	0.6149	0.4374	0.0299	0.2926	0.8146	0.0006	0.0512
Treatment F			34.827	15.295	3.649	9.094	43.219	7.086	3.226	5.603
Treatment Prob(F)			0.0001	0.0001	0.0093	0.0001	0.0001	0.0002	0.0165	0.0010

Means followed by same letter do not differ significantly (P=.05, LSD).

Japanese climbing fern control on MS rights-of-way (Continued)

Protocol ID:

Trial ID:

Location: Poplarville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Type	W Weed	W Weed			
Pest Code	LYFJA	ANOSC			
Pest Name	Japanese cl>	Little blue>			
Crop Name					
Rating Date	8/7/15	8/7/15			
Rating Data Type	GROUND	GROUND			
Rating Unit	%AREA	%AREA			
Days After First/Last Applic.	364 364	364 364			
Trt-Eval Interval	28 DA-A	28 DA-A			
ARM Action Codes	L05	L05			
Trt No.	Treatment Name	Rate	Unit		
1	Accord XRT	1 gal/a		25	26
2	Escort	1 oz ai/a		6.7 c	3.0 d
	NIS	0.25 % v/v		5.0 c	60.0 ab
3	Arsenal 2	1 % v/v		3.3 c	56.7 ab
	NIS	0.25 % v/v			
4	Garlon 4	4 % v/v		40.0 b	66.7 a
	NIS	0.25 % v/v			
5	Plateau	1.5 % v/v		3.3 c	31.7 bcd
	NIS	0.25 % v/v			
6	Oust	1 oz ai/a		43.3 b	45.0 abc
	NIS	0.25 % v/v			
7	Perspective	5 oz wt/a		41.7 b	63.3 a
	NIS	0.25 % v/v			
8	Milestone	7 fl oz/a		53.3 ab	31.7 bcd
	NIS	0.25 % v/v			
9	MSMA	0.5 gal/a		53.3 ab	46.7 abc
	NIS	0.25 % v/v			
10	Untreated Check			76.7 a	25.0 cd
LSD (P=.05)				30.66	31.44
Standard Deviation				17.88	18.33
CV				54.72	42.66
Bartlett's X2				17.275	10.383
P(Bartlett's X2)				0.045*	0.32
Replicate F				0.519	8.274
Replicate Prob(F)				0.6038	0.0028
Treatment F				6.469	3.619
Treatment Prob(F)				0.0004	0.0097

Means followed by same letter do not differ significantly (P=.05, LSD).

Control of winter annual grasses and bahiagrass tolerance studies using Piper

Protocol ID: PR 01.03

Trial ID: PR 01.03

Location: Meridian, MS

Study Director: Victor Maddox

Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox

Title: _____

Investigator: John Byrd

Title: _____

Trial Location

City: Meridian

Trial Status: _____Completed_____

State/Prov.: MS

Trial Reliability: _____

Conducted Under GLP:

Official Trial Code: _____

Conducted Under GEP:

Other Trial Code: _____

Results and Conclusions

Objectives:

Evaluate efficacy and turf tolerance of fall-applied Piper and Piper tank mixes against Italian ryegrass and other winter weeds in unimproved bahiagrass (*Paspalum notatum*) or bermudagrass (*Cynodon dactylon*) roadside turf.

Results:

Overall Cover. Overall cover was 78.3 on average at 0 DAT (25 Nov 2014). Seventy percent of this cover was attributed to bahiagrass. Cool-season weed cover ranged from 38.3 to 28.3 percent and bermudagrass from 21.7 to 10 percent at 0 DAT. No significant differences in cold-season weed cover was observed at 7 DAT, but discoloration was observed in treatments containing Glyphomax XRT.

Bahiagrass Response. No change in color or cover was observed at 7 DAT. However, significant discoloration was observed 14 DAT with no change in cover. Only Piper at 4 oz/A plus Glyphomax XRT and Milestone plus SFM75 plus Glyphomax XRT treatments were not significantly discolored. This tended to be the pattern through 27 DAT. In addition, significant foliar damage was also observed at 27 DAT. Foliar loss was more pronounced in plots receiving higher rates of Piper or combinations with Piper. Interestingly, bahiagrass damage was significant at 150 DAT in spring for all three treatments with Glyphomax XRT (Chart 63). Control ranged from 41.7 to 56.7 percent. Thus, even with a late application and low rates (18 oz/A) of Glyphomax, bahiagrass damage could be an issue. No control was observed in other treatments. This illustrates that Piper discoloration did not result in significant losses in cover in spring following the fall application.

Bermudagrass Response. Bermudagrass cover was low at 0 DAT (November 25, 2014) ranging from 10 to 21.7 percent cover and remained low through green-up the following spring (2 to 9 percent cover, April 24, 2015). Bermudagrass cover did increase by 181 DAT and there seemed to be decreased cover with increased rate of Piper, but differences were not significant.

Cool-season Weed Response. Significant discoloration of cool-season grasses was evident at 7, 14, and 27 DAT and significant cover reductions evident at 14 and 27 DAT in plots treated with Glyphomax XRT combinations. This is expected since Glyphomax is a non-selective postemergence herbicide. It also illustrates the importance of the product in a mix where weeds have already germinated, particularly with late fall or early winter applications.

Annual Ryegrass Response. At 120 DAT, higher rates of Piper or combinations with Piper tended to have better control of annual ryegrass (*Lolium multiflorum*) but most differences were not significant. Piper at 8 oz/A plus Glyphomax XRT (18 oz/A) was the best treatment (96.3 % control). This pattern remained through 150 DAT (Chart 64).

Interestingly, little barley (*Hordeum pusillum*) control was significantly higher in treatments receiving Glyphomax XRT. This indicates that little barley had germinated prior to the applications made on November 25, 2014, and reiterates the importance of a glyphosate product in the mix.

Control of winter annual grasses and bahiagrass tolerance studies using Piper (Continued)

Protocol ID: PR 01.03

Trial ID: PR 01.03

Location: Meridian, MS

Study Director: Victor Maddox

Investigator: John Byrd

Large hop clover (*Trifolium campestre*) control was lowest in the 4 oz/A Piper plus Glyphomax XRT plots, but was not significant from other treatments at 120 DAT. Most treatments were over 90 percent control. Crimson clover (*Trifolium incarnatum*) control was similar, but control was also lower in the 4 oz/A Piper alone treatment. Results were similar for common vetch (*Vicia sativa*). This pattern was similar through 150 DAT.

Warm-season Weed Response. Southern crabgrass (*Digitaria ciliaris*) (not smooth crabgrass) cover seemed to increase with increasing rate of Piper, except for the 4 oz/A rate (Chart 65). This was likely due to no residual at 181 DAT and crabgrass release from cool-season weeds controlled by Piper prior to crabgrass germination. This was probably a similar case for Japanese lespedeza (*Kummerowia striata*) at 181 DAT. Canada horseweed (Marestail) (*Conyza canadensis*) showed a different trend at 181 DAT (Chart 66). Treatments receiving Glyphomax XRT had the lowest cover. Like little barley, it is likely horseweed had germinated prior to application in November.

Overall Conclusions: Piper has activity on annual ryegrass. Despite bahiagrass discoloration by Piper treatments alone or with SFM 75, no damage was observed in spring green-up. The addition of Glyphomax XRT assisted in the control of some weeds, but damaged bahiagrass. These treatments should be used cautiously in bahiagrass turf. Some summer weeds seemed to be released in spring transition thus a spring herbicide application to address this issue would be suggested.

Site and Design

Plot Width, Unit: 10 FT Site Type: _____
 Plot Length, Unit: 40 FT Tillage Type: _____
 Replications: 3 Study Design: Randomized Complete Block

Trial Initiation Comments:

Tips of Bahiagrass foliage were burned from previous freeze, but most of foliage remained green. Ryegrass, downy brome, and clover were up at initiation. The clover was mostly at the cotyledon stage. Grasses were still very small. Tolerance study was just upslope from the cool-season grasses, so plots slightly split depending upon species. Thus, bahiagrass and clover cover were for the upslope area only (furthest from the highway) and likewise for cool-season annual grasses, bermudagrass, and crabgrass area downslope (closest to the highway). Bermudagrass was dormant at the time of application and ratings. Ratings were taken for potential use in spring 2015 ratings. Crabgrass was dead at the time of rating. However, cover ratings were taken for potential use in spring 2015 evaluations.

Comment: Area had been previously mowed by MDOT, so plots were relatively clean.

Application Description

	A
Application Date:	11/25/14
Time of Day:	11 AM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VLM
Air Temperature, Unit:	55 F
% Relative Humidity:	60
Wind Velocity, Unit:	8 MPH
Wind Direction:	NNW
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	70

Control of winter annual grasses and bahiagrass tolerance studies using Piper (Continued)

Protocol ID: PR 01.03

Trial ID: PR 01.03

Location: Meridian, MS

Study Director: Victor Maddox

Investigator: John Byrd

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	2 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Reps: 3

Plots: 10 by 40 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 2.607)

Trt No.	Treatment Type	Form Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt to Measure	Product	Plot No. By Rep		
											1	2	3
1	CHK	Untreated Check									101	203	307
2	HERB ADJ	Piper NIS	76 %	%WW	WG	4 oz	wt/a	A	2.397 g/mx		102	206	301
			100 %		SL	0.25 %	v/v	A	4.999 ml/mx				
3	HERB ADJ	Piper NIS	76 %	%WW	WG	6 oz	wt/a	A	3.595 g/mx		103	202	304
			100 %		SL	0.25 %	v/v	A	4.999 ml/mx				
4	HERB ADJ	Piper NIS	76 %	%WW	WG	8 oz	wt/a	A	4.793 g/mx		104	209	303
			100 %		SL	0.25 %	v/v	A	4.999 ml/mx				
5	HERB ADJ	Piper NIS	76 %	%WW	WG	4 oz	wt/a	A	2.397 g/mx		105	204	309
	HERB ADJ	SFM75 NIS	75 %	%WW	WG	0.5 oz	wt/a	A	0.2996 g/mx				
			100 %		SL	0.25 %	v/v	A	4.999 ml/mx				
6	HERB ADJ	Piper NIS	76 %	%WW	WG	8 oz	wt/a	A	4.793 g/mx		106	208	302
	HERB ADJ	SFM75 NIS	75 %	%WW	WG	0.5 oz	wt/a	A	0.2996 g/mx				
			100 %		SL	0.25 %	v/v	A	4.999 ml/mx				
7	HERB ADJ	Piper NIS	76 %	%WW	WG	4 oz	wt/a	A	2.397 g/mx		107	205	308
	HERB ADJ	Glyphomax XRT	5.4	LBA/GAL	SL	18.0	fl oz/a	A	11.25 ml/mx				
8	HERB ADJ	Piper NIS	76 %	%WW	WG	8 oz	wt/a	A	4.793 g/mx		108	207	306
	HERB ADJ	Glyphomax XRT	5.4	LBA/GAL	SL	18.0	fl oz/a	A	11.25 ml/mx				
9	HERB ADJ	Milestone NIS	2	LB/GAL	SL	5	fl oz/a	A	3.125 ml/mx		109	201	305
	HERB ADJ	SFM75 NIS	75 %	%WW	WG	0.5 oz	wt/a	A	0.2996 g/mx				
	HERB ADJ	Glyphomax XRT	5.4	LBA/GAL	SL	18.0	fl oz/a	A	11.25 ml/mx				

Control of winter annual grasses and bahiagrass tolerance studies using Piper (Continued)

Protocol ID: PR 01.03

Trial ID: PR 01.03

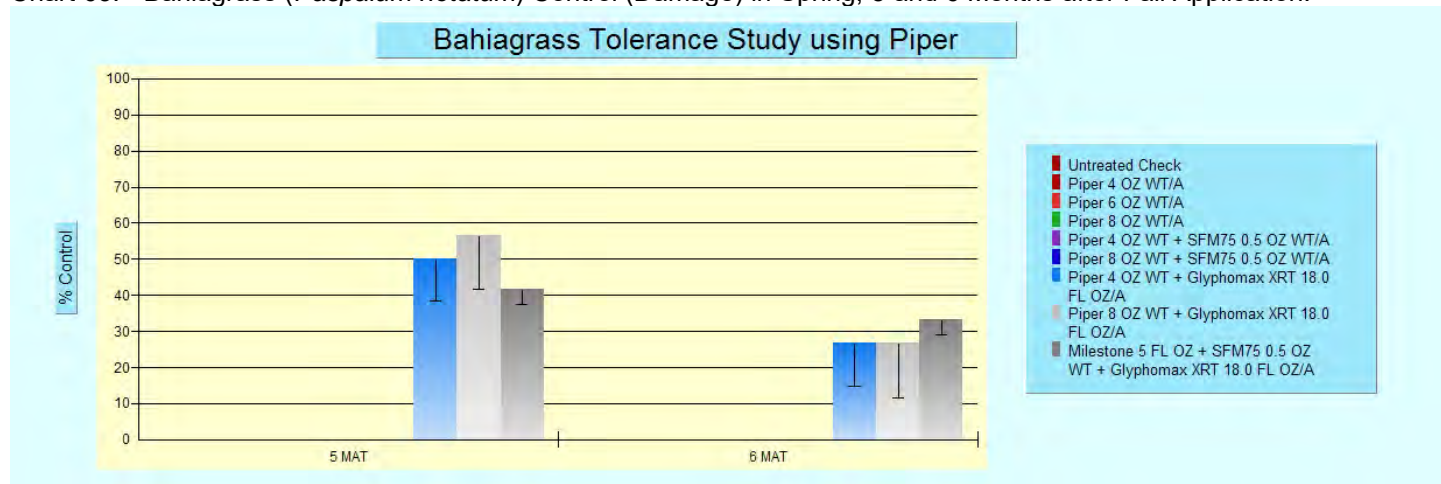
Location: Meridian, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name				Cool-season	Smooth crab>	CYND	Cool-season	
Crop Code						BGRM		
BBCH Scale						Bermuda gra>		
Crop Name		Paspalum n>	Overall-S2	Paspalum n>		11/25/14	12/2/14	
Rating Date		11/25/14	11/25/14	11/25/14	11/25/14	11/25/14	GROUND	
Rating Data Type		GROUND	GROUND	COLOR	GROUND	GROUND	GROUND	
Rating Unit		%	%	1-9	%	%	%	
Trt Treatment	Rate							
No. Name	Rate Unit	1	2	3	4	5	6	7
1 Untreated Check		70.0	78.3	6.0	30.0	25.0	21.7	30.0 a
2 Piper	4 oz wt/a	70.0	78.3	6.0	31.7	23.3	13.3	31.7 a
NIS	0.25 % v/v							
3 Piper	6 oz wt/a	70.0	78.3	6.0	31.7	26.7	15.0	31.7 a
NIS	0.25 % v/v							
4 Piper	8 oz wt/a	70.0	78.3	6.0	31.7	26.7	10.0	31.7 a
NIS	0.25 % v/v							
5 Piper	4 oz wt/a	70.0	78.3	6.0	28.3	26.7	20.0	28.3 a
SFM75	0.5 oz wt/a							
NIS	0.25 % v/v							
6 Piper	8 oz wt/a	70.0	78.3	6.0	36.7	26.7	10.0	36.7 a
SFM75	0.5 oz wt/a							
NIS	0.25 % v/v							
7 Piper	4 oz wt/a	70.0	78.3	6.0	33.3	26.7	16.7	33.3 a
Glyphomax XRT	18.0 fl oz/a							
8 Piper	8 oz wt/a	70.0	78.3	6.0	38.3	30.0	10.0	38.3 a
Glyphomax XRT	18.0 fl oz/a							
9 Milestone	5 fl oz/a	70.0	78.3	6.0	38.3	30.0	10.0	38.3 a
SFM75	0.5 oz wt/a							
Glyphomax XRT	18.0 fl oz/a							
LSD (P=Various)		0.00	0.00	0.00	10.25	6.18	13.09	10.25
Standard Deviation		0.00	0.00	0.00	5.92	3.57	7.56	5.92
CV		0.0	0.0	0.0	17.77	13.29	53.73	17.77
Bartlett's X2		0.0	0.0	0.0	5.515	0.059	4.997	5.515
P(Bartlett's X2)		.	1.00	.	0.701	1.00	0.416	0.701
Mean Sep. Test								LSD.05
Replicate F		0.000	0.000	0.000	8.871	9.673	2.057	8.871
Replicate Prob(F)		1.0000	1.0000	1.0000	0.0026	0.0018	0.1604	0.0026
Treatment F		0.000	0.000	0.000	1.129	1.055	1.097	1.129
Treatment Prob(F)		1.0000	1.0000	1.0000	0.3961	0.4388	0.4138	0.3961

Means followed by same letter do not differ significantly.

Chart 63. Bahiagrass (*Paspalum notatum*) Control (Damage) in Spring, 5 and 6 Months after Fall Application.

Control of winter annual grasses and bahiagrass tolerance studies using Piper (Continued)

Protocol ID: PR 01.03

Trial ID: PR 01.03

Location: Meridian, MS

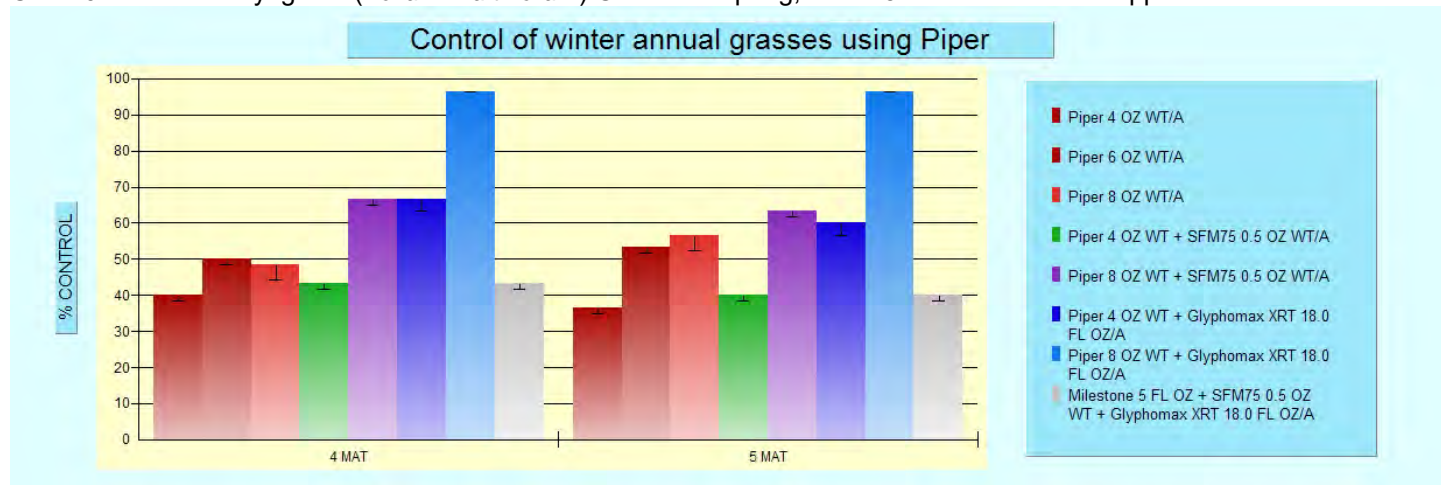
Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Cool-season			Cool-season	Cool-season				
Crop Code		Paspalum n>	Paspalum n>			Paspalum n>	Paspalum n>		
BBCH Scale		12/2/14	12/2/14	12/9/14	12/9/14	12/9/14	12/9/14		
Crop Name		COLOR	GROUND	GROUND	COLOR	COLOR	GROUND		
Rating Date	12/2/14	1-9	1-9	%	%	1-9	1-9		
Rating Data Type	COLOR	COLOR	GROUND	GROUND	COLOR	COLOR	GROUND		
Rating Unit	1-9	1-9	%	%	1-9	1-9	%		
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate	Rate		
		Unit	Unit	Unit	Unit	Unit	Unit		
		8	9	10	11	12	13		
1	Untreated Check								
2	Piper NIS	4 oz wt/a 0.25 % v/v	8.0 a	6.0 a	70.0 a	40.0 a	8.0 a	6.0 a	70.0 a
3	Piper NIS	6 oz wt/a 0.25 % v/v	8.0 a	6.0 a	70.0 a	31.7 a	8.0 a	4.0 b	70.0 a
4	Piper NIS	8 oz wt/a 0.25 % v/v	8.0 a	6.0 a	70.0 a	35.0 a	8.0 a	4.0 b	70.0 a
5	Piper SFM75 NIS	4 oz wt/a 0.5 oz wt/a 0.25 % v/v	8.0 a	6.0 a	70.0 a	28.3 a	8.0 a	4.0 b	70.0 a
6	Piper SFM75 NIS	8 oz wt/a 0.5 oz wt/a 0.25 % v/v	8.0 a	6.0 a	70.0 a	43.3 a	8.0 a	4.0 b	70.0 a
7	Piper Glyphomax XRT	4 oz wt/a 18.0 fl oz/a	6.7 b	6.0 a	70.0 a	5.0 b	3.0 b	5.3 a	70.0 a
8	Piper Glyphomax XRT	8 oz wt/a 18.0 fl oz/a	6.3 b	6.0 a	70.0 a	3.0 b	2.3 c	4.3 b	70.0 a
9	Milestone SFM75 Glyphomax XRT	5 fl oz/a 0.5 oz wt/a 18.0 fl oz/a	6.7 b	6.0 a	70.0 a	5.7 b	3.0 b	5.7 a	70.0 a
LSD (P=Various)			0.53	0.00	0.00	16.98	0.33	0.70	0.00
Standard Deviation			0.30	0.00	0.00	9.81	0.19	0.40	0.00
CV			4.05	0.0	0.0	39.48	3.07	8.69	0.0
Bartlett's X2			0.0	0.0	0.0	16.212	0.0	0.0	0.0
P(Bartlett's X2)			1.00	.	.	0.023*	.	1.00	.
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			2.800	0.000	0.000	6.935	1.000	0.229	0.000
Replicate Prob(F)			0.0906	1.0000	1.0000	0.0068	0.3897	0.7982	1.0000
Treatment F			17.200	0.000	0.000	7.864	555.250	12.057	0.000
Treatment Prob(F)			0.0001	1.0000	1.0000	0.0003	0.0001	0.0001	1.0000

Means followed by same letter do not differ significantly.

Chart 64. Annual Ryegrass (*Lolium multiflorum*) Control in Spring, 4 and 5 Months after Fall Application.



Control of winter annual grasses and bahiagrass tolerance studies using Piper (Continued)

Protocol ID: PR 01.03

Trial ID: PR 01.03

Location: Meridian, MS

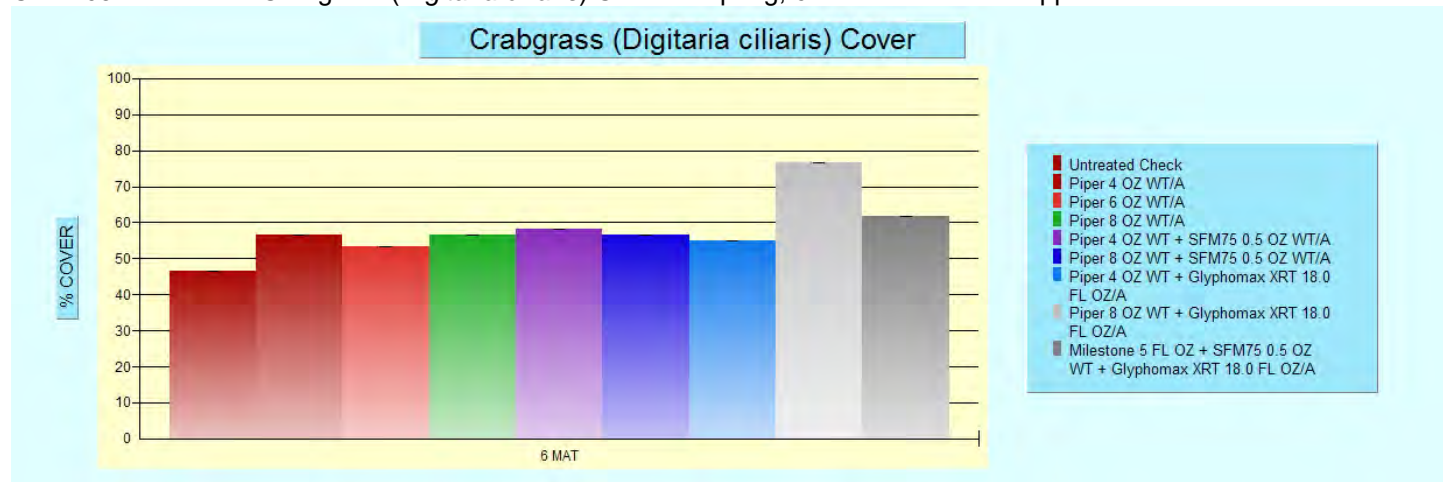
Study Director: Victor Maddox

Investigator: John Byrd

Pest Type						W Weed LOLMU Italian rye>	W Weed TRFCA Large hop c>	W Weed HORPU Little barl>
Pest Code								
Pest Name	Cool-season	Cool-season						
Crop Code								
BBCH Scale								
Crop Name			Paspalum n>	Paspalum n>				
Rating Date	12/22/14	12/22/14	12/22/14	12/22/14	12/22/14	3/25/15	3/25/15	3/25/15
Rating Data Type	GROUND	COLOR	GROUND	COLOR	COLOR	CONTRO	CONTRO	CONTRO
Rating Unit	%	1-9	%	1-9	%	%	%	%
Days After First/Last Applic.	27 27	27 27	27 27	27 27	27 27	120 120	120 120	120 120
Trt-Eval Interval	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A
ARM Action Codes	L05	L05	L05	L05	L05	L05E	L05E	L05E
Trt Treatment	Rate							
No. Name	Rate Unit	15	16	17	18	19	20	21
1 Untreated Check		31.7 a	8.0 a	68.3 a	5.7 a	13.3	10.0	0.0
2 Piper NIS	4 oz wt/a 0.25 % v/v	40.0 a	8.0 a	43.3 bc	2.7 cd	40.0 b	91.3 a	10.0 b
3 Piper NIS	6 oz wt/a 0.25 % v/v	33.3 a	8.0 a	23.3 d	2.3 d	50.0 b	96.3 a	6.7 b
4 Piper NIS	8 oz wt/a 0.25 % v/v	35.0 a	8.0 a	28.3 cd	2.7 cd	48.3 b	94.7 a	15.0 b
5 Piper SFM75 NIS	4 oz wt/a 0.5 oz wt/a 0.25 % v/v	26.7 a	8.0 a	25.0 d	2.3 d	43.3 b	88.3 a	18.3 b
6 Piper SFM75 NIS	8 oz wt/a 0.5 oz wt/a 0.25 % v/v	43.3 a	8.0 a	28.3 cd	3.0 c	66.7 ab	96.3 a	10.0 b
7 Piper Glyphomax XRT	4 oz wt/a 18.0 fl oz/a	5.0 b	3.0 b	56.7 ab	4.3 b	66.7 ab	43.3 b	80.0 a
8 Piper Glyphomax XRT	8 oz wt/a 18.0 fl oz/a	3.3 b	1.7 c	26.7 d	2.7 cd	96.3 a	98.0 a	93.0 a
9 Milestone SFM75 Glyphomax XRT	5 fl oz/a 0.5 oz wt/a 18.0 fl oz/a	5.7 b	3.0 b	53.3 ab	4.7 b	43.3 b	99.7 a	96.0 a
LSD (P=Various)		18.18	0.67	16.18	0.56	33.09	16.33	25.43
Standard Deviation		10.50	0.38	9.35	0.33	18.89	9.33	14.52
CV		42.2	6.22	23.81	9.68	33.24	10.54	35.31
Bartlett's X2		9.496	0.0	16.334	0.0	9.608	22.303	10.276
P(Bartlett's X2)		0.219	.	0.038*	1.00	0.212	0.002*	0.173
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		6.141	1.000	0.201	17.043	4.200	0.247	1.041
Replicate Prob(F)		0.0105	0.3897	0.8197	0.0001	0.0373	0.7843	0.3789
Treatment F		6.869	153.063	9.515	41.043	3.027	11.943	23.454
Treatment Prob(F)		0.0006	0.0001	0.0001	0.0001	0.0370	0.0001	0.0001

Means followed by same letter do not differ significantly.

Chart 65. Southern Crabgrass (*Digitaria ciliaris*) Cover in Spring, 6 Months after Fall Application.



Control of winter annual grasses and bahiagrass tolerance studies using Piper (Continued)

Protocol ID: PR 01.03

Trial ID: PR 01.03

Location: Meridian, MS

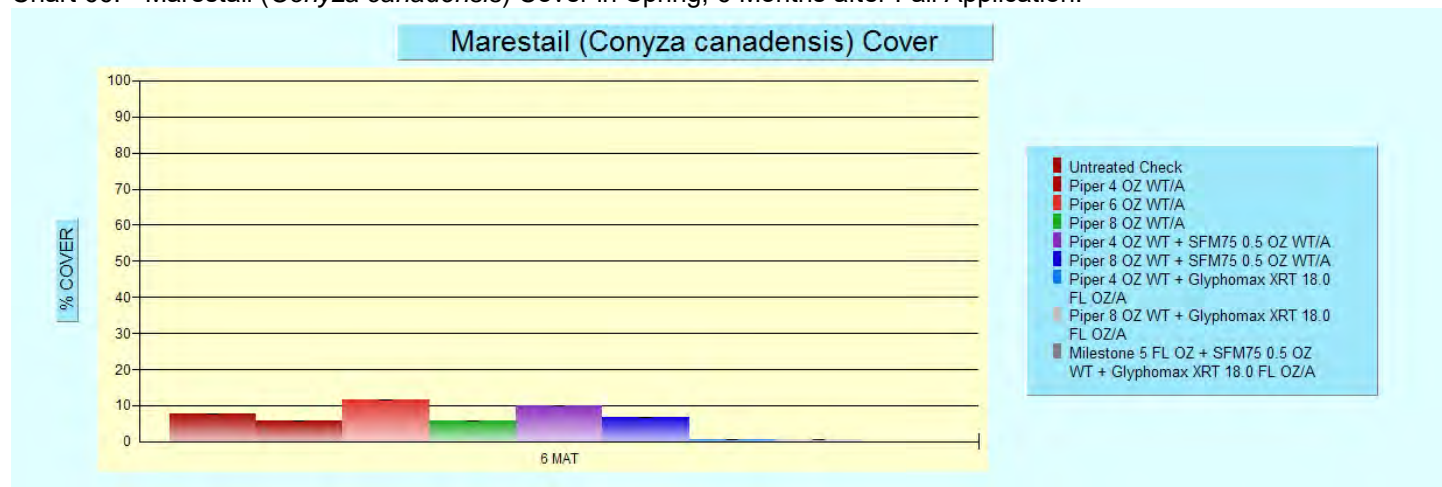
Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Carnation c>	Common vetch	Italian rye>	Large hop c>	CYND BGRM	PASNO BGRM	Carnation c>
Crop Code					Bermuda gra>	Bahiagrass	
BBCH Scale					4/24/15	4/24/15	4/24/15
Crop Name					GROUND	CONTRO	CONTRO
Rating Date	3/25/15	3/25/15	4/24/15	4/24/15			
Rating Data Type	CONTRO	CONTRO	CONTRO	CONTRO			
Rating Unit	%	%	%	%	%	%	%
Trt Treatment							
No. Name	22	23	24	25	26	27	28
Rate							
Rate Unit							
1 Untreated Check	0.0	0.0	0.0	0.0	9.0 a	0.0	0.0
2 Piper NIS 4 oz wt/a 0.25 % v/v	76.7 c	68.3 a	36.7 b	88.0 a	8.0 a	0.0 c	73.3 a
3 Piper NIS 6 oz wt/a 0.25 % v/v	91.3 ab	66.7 a	53.3 b	91.7 a	4.7 a	0.0 c	84.3 a
4 Piper NIS 8 oz wt/a 0.25 % v/v	93.3 ab	91.7 a	56.7 b	94.7 a	2.0 a	0.0 c	81.7 a
5 Piper SFM75 NIS 4 oz wt/a 0.5 oz wt/a 0.25 % v/v	98.7 a	96.0 a	40.0 b	70.0 b	9.0 a	0.0 c	96.3 a
6 Piper SFM75 NIS 8 oz wt/a 0.5 oz wt/a 0.25 % v/v	99.0 a	94.3 a	63.3 b	93.3 a	3.0 a	0.0 c	96.7 a
7 Piper Glyphomax XRT 4 oz wt/a 18.0 fl oz/a	86.7 bc	26.7 a	60.0 b	30.0 c	7.3 a	50.0 ab	70.0 a
8 Piper Glyphomax XRT 8 oz wt/a 18.0 fl oz/a	96.3 ab	92.7 a	96.3 a	98.0 a	3.0 a	56.7 a	94.3 a
9 Milestone SFM75 Glyphomax XRT 5 fl oz/a 0.5 oz wt/a 18.0 fl oz/a	100.0 a	100.0 a	40.0 b	99.7 a	3.0 a	41.7 b	97.3 a
LSD (P=Various)	11.83	48.42	28.71	15.00	10.39	8.83	20.62
Standard Deviation	6.75	27.65	16.39	8.56	6.00	5.04	11.77
CV	7.28	34.76	29.38	10.3	110.27	27.21	13.57
Bartlett's X2	19.903	26.515	9.025	18.441	11.778	0.556	16.097
P(Bartlett's X2)	0.003*	0.001*	0.251	0.01*	0.108	0.757	0.024*
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	0.825	0.291	3.939	0.384	2.284	0.532	0.737
Replicate Prob(F)	0.4586	0.7516	0.0439	0.6879	0.1341	0.5988	0.4963
Treatment F	4.110	2.419	4.131	22.353	0.684	79.105	2.634
Treatment Prob(F)	0.0118	0.0756	0.0115	0.0001	0.6996	0.0001	0.0583

Means followed by same letter do not differ significantly.

Chart 66. Marestail (*Conyza canadensis*) Cover in Spring, 6 Months after Fall Application.



Control of winter annual grasses and bahiagrass tolerance studies using Piper (Continued)

Protocol ID: PR 01.03

Trial ID: PR 01.03

Location: Meridian, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Common vetch	Smooth crab>	Overall	CYNDA BGRM Bermuda gra>	Japanese le>	Canada hors>	PASNO BGRM Bahiagrass		
Crop Code									
BBCH Scale									
Crop Name									
Rating Date	4/24/15	5/25/15	5/25/15	5/25/15	5/25/15	5/25/15	5/25/15		
Rating Data Type	CONTRO	GROUND	GROUND	GROUND	GROUND	GROUND	CONTRO		
Rating Unit	%	%	%	%	%	%	%		
Trt	Treatment	Rate							
No.	Name	Rate Unit	29	30	31	32	33	34	35
1	Untreated Check		0.0	11.7 c	46.7 a	17.3 a	5.0 a	7.7 ab	0.0
2	Piper NIS	4 oz wt/a 0.25 % v/v	41.7 b	20.0 bc	56.7 a	10.7 a	10.0 a	5.7 abc	0.0 b
3	Piper NIS	6 oz wt/a 0.25 % v/v	63.3 ab	13.3 c	53.3 a	9.0 a	13.3 a	11.7 a	0.0 b
4	Piper NIS	8 oz wt/a 0.25 % v/v	91.7 a	21.7 bc	56.7 a	4.0 a	18.3 a	5.7 abc	0.0 b
5	Piper SFM75 NIS	4 oz wt/a 0.5 oz wt/a 0.25 % v/v	96.0 a	13.3 c	58.3 a	17.3 a	11.7 a	10.0 a	0.0 b
6	Piper SFM75 NIS	8 oz wt/a 0.5 oz wt/a 0.25 % v/v	94.3 a	33.3 b	56.7 a	3.0 a	13.3 a	6.7 abc	0.0 b
7	Piper Glyphomax XRT	4 oz wt/a 18.0 fl oz/a	26.7 b	15.0 c	55.0 a	14.7 a	8.3 a	0.7 bc	26.7 a
8	Piper Glyphomax XRT	8 oz wt/a 18.0 fl oz/a	92.7 a	70.0 a	76.7 a	2.0 a	10.0 a	0.7 bc	26.7 a
9	Milestone SFM75 Glyphomax XRT	5 fl oz/a 0.5 oz wt/a 18.0 fl oz/a	100.0 a	20.0 bc	61.7 a	9.0 a	16.7 a	0.0 c	33.3 a
LSD (P=Various)			49.30	13.40	15.29	22.47	11.97	7.54	12.96
Standard Deviation			28.15	7.74	8.83	12.98	6.91	4.36	7.40
CV			37.14	31.92	15.24	134.26	58.34	80.6	68.31
Bartlett's X2			26.817	5.967	4.815	12.546	1.982	9.108	0.0
P(Bartlett's X2)			0.001*	0.651	0.777	0.084	0.982	0.245	1.00
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			0.286	4.371	1.507	2.581	0.368	3.494	0.304
Replicate Prob(F)			0.7557	0.0306	0.2513	0.1068	0.6978	0.0551	0.7424
Treatment F			3.033	16.892	2.531	0.623	1.065	2.789	12.478
Treatment Prob(F)			0.0367	0.0001	0.0542	0.7472	0.4324	0.0385	0.0001

Means followed by same letter do not differ significantly.

Control of winter annual grasses and bahiagrass tolerance studies using Piper (Continued)

Protocol ID: PR 01.03

Location: Meridian, MS

Trial ID: PR 01.03

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name			Clover
Crop Code			
BBCH Scale			
Crop Name			
Rating Date			5/25/15
Rating Data Type			GROUND
Rating Unit			%
Trt No.	Treatment Name	Rate	
		Unit	36
1	Untreated Check		0.0 b
2	Piper	4 oz wt/a	0.0 b
	NIS	0.25 % v/v	
3	Piper	6 oz wt/a	0.0 b
	NIS	0.25 % v/v	
4	Piper	8 oz wt/a	0.0 b
	NIS	0.25 % v/v	
5	Piper	4 oz wt/a	0.0 b
	SFM75	0.5 oz wt/a	
	NIS	0.25 % v/v	
6	Piper	8 oz wt/a	0.0 b
	SFM75	0.5 oz wt/a	
	NIS	0.25 % v/v	
7	Piper	4 oz wt/a	11.7 a
	Glyphomax XRT	18.0 fl oz/a	
8	Piper	8 oz wt/a	13.3 a
	Glyphomax XRT	18.0 fl oz/a	
9	Milestone	5 fl oz/a	5.0 ab
	SFM75	0.5 oz wt/a	
	Glyphomax XRT	18.0 fl oz/a	
LSD (P=Various)			9.01
Standard Deviation			5.20
CV			156.12
Bartlett's X2			2.109
P(Bartlett's X2)			0.348
Mean Sep. Test			LSD.05
Replicate F			2.769
Replicate Prob(F)			0.0927
Treatment F			3.308
Treatment Prob(F)			0.0199

Means followed by same letter do not differ significantly.

Derigo for Annual Weed Control on Roadsides
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General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Title: _____
Title: _____

Trial Location

City: Meridian
State/Prov.: MS
Directions:

Trial Status: _____
Trial Reliability: _____

West side of Hwy 45 South of Meridian, approximately 0.5 north of CEFCO.

Conducted Under GEP: X

Other Trial Code: _____

Results and Conclusions:

Cool-Season Weed Responses. Annual ryegrass (*Lolium multiflorum*), small hop clover (*Trifolium dubium*), and crimson clover (*Trifolium incarnatum*) were the primary cover species at 0 DAT with 40, 26.7, and 30.7 on average, respectively (Chart 67). Plots were observed at 1 WAT (3/31/15), but control was not observed at this time and only images were taken.

At 1 MAT, annual ryegrass control was significantly higher in plots treated with Accord XRT II plus Oust, standard treatment (Chart 67). Control of small hop and crimson clovers was highest in the Esplanade plus Method plus 2,4-D treatments, but was not significantly higher than treatments with Perspective, or Plateau plus Milestone for crimson clover. All products had activity on Carolina geranium (*Geranium carolinianum*), common vetch (*Vicia sativa*), field madder (*Sherardia arvensis*), and hairyfruit chervil (*Chaerophyllum tainturieri*) at 1 MAT. However, Plateau plus Milestone and Accord plus Oust treatments showed less control on Carolina geranium. In addition, Plateau plus Milestone showed less control on hairyfruit chervil.

At 182 DAT 2 (2015-2016 winter), ryegrass cover was not significantly different. Interestingly, ryegrass cover increased in treated plots. It is highly likely that this increase was due to bahiagrass turf damage from treatments applied during the 2015 growing season. This illustrates the importance of a dense turf in weed prevention. Overall cover was not significant compared to the untreated, illustrating again the ability of ryegrass to fill open areas due to turf loss.

Warm-Season Weed Responses. At 73 DAT (0 DAT 2), broomsedge (*Andropogon virginicus*) cover was lowest (0.7 percent) in the Accord plus Oust treatment, but was not significantly lower than other treatments (range of 3.0 to 6.0 percent). Accord plus Oust also had significantly higher crabgrass cover (65%) at 73 DAT. Treatments with Esplanade had the lowest crabgrass cover (10% each on average). At 31 DAT 2, broomsedge and crabgrass (*Digitaria* spp.) control was observed, but not significant among treated plots for either species. Crabgrass control ranged from 95.3 to 99.0 percent on average. This was manifested in overall crabgrass cover ranging from 1.3 to 4.0 in treated plots compared to 40 percent in the untreated, also a significant difference. Because Application 2 was the same for all treatments, it's likely that there is some cumulative effect of both applications. This may be evident in Chart 68 where some treatments appear to regain crabgrass cover faster than others. Broomsedge control was not as good and ranged from 36.7 to 70.0 percent on average. Control of crabgrass was still good at 61 DAT 2 ranging from 85.0 to 95.0 percent on average. Cover ranged from 5.0 to 11.7 percent in treated plots, but was not significantly less than the untreated at 31.7 percent. At 91 DAT 2, crabgrass control was remained high (78.3 to 95 percent) but crabgrass cover was increasing. Perspective plus 2,4-D (21.7 %) and Accord plus Oust (20.0 %) treatments were not significantly reduced compared to the untreated plots (40.0 %). This trend remained through the end of the growing 2015 growing season. At 122 DAT 2, broomsedge cover in treated plots was not significantly less compared to the untreated, but showed a reduction. Cover in treated plots ranged from 2.0 to 0.00 percent compared to 10.7 percent in the untreated plots. This trend was evident through 1 YAT 2 (7 June 2016) the following year. It is likely that the products have varying degrees of activity on broomsedge but it was not significant in this study.

Horseweed (*Conyza canadensis*) cover was rated at 1 YAT 2 on 7 June 2016, but differences were not significant.

Derigo for Annual Weed Control on Roadsides (Continued)
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Results and Conclusions (Continued):

Turfgrass Response. Bermudagrass cover was lowest (16.7 percent) in the Accord plus Oust treatment at 73 DAT (0 DAT 2), but was not significant from other treatments (20.7 to 30 percent). This trend was similar for bahiagrass cover. Overall plot turf color at the time of Application 2 (73 DAT 1) was 6 and overall cover ranged from 86.7 (untreated) to 46.7 with no significant cover differences between treated plots which ranged from 60 to 46.7 percent. AT 31 DAT 2, bahiagrass control (damage) was significantly higher in treatments plots that had lower cover prior to the application (Chart 69). Bermudagrass damage was less apparent and ranged from 6.7 to 10 percent with no significant differences among treatments. Some discoloration was observed in bermudagrass plots but it was not significant compared to the untreated and bermudagrass cover was higher in treated plots compared to the untreated (Chart 70), an indication that it was released by the treatments. However, bahiagrass cover in all treated plots was reduced (11.7 to 28.3 compared to 38.8 for the untreated), but not significantly reduced in the Perspective plus 2,4-D treatment compared to the check. In addition, bahiagrass discoloration was significant in all treatments compared to the untreated (7.0), and particularly the Esplanade plus Perspective, plus 2,4-D treatment (2.7). It is unclear why this occurred, but it was not significant compared to discoloration observed in other treatments. Overall cover was significantly lower in all treated plots compared to the check which is likely a result of both reduced weed (crabgrass, in particular) and bahiagrass cover. This trend in cover remained through 61 DAT 2. By 61 DAT 2, bahiagrass control ranged from 91.7 to 95 percent in treated plots. It is not clear if Derigo, Accord, or the combination of the two products resulted in this level of damage, but the treatment would be unacceptable for actively growing bahiagrass turf. Bahiagrass cover in treated plots ranged from 5.7 to 8.3 percent compared to 45 percent in untreated plots (Chart 69). Unfortunately, this trend remained through 1 YAT 2 into 2016 (7 June 2016) (Chart 71) and influenced winter weed cover during the 2015-2016 winter. No control (damage) was observed on bermudagrass from any treatments on the same date and through the remainder of the study. Bermudagrass cover ranged from 23.7 to 46.7 across all treatments at 61 DAT 2 (Chart 70). At 91 days after second application, overall cover was reduced in treated plots compared the untreated. This trend remained through the end of the 2015 growing season. Bermudagrass cover was higher in all treated plots, except Accord plus Oust, compared to the untreated at 91 DAT 2 (Chart 70). The Accord plus Oust treatment had the same cover as the untreated (28.3 percent). However, differences were not significant. By 122 DAT 2, differences in bermudagrass cover were not significant compared to the untreated and this trend remained through 1 YAT 2 (7 June 2016) (Chart 72), although bermudagrass cover was higher in treated plots.

At 1 YAT 2 (7 June 2016), differences in overall cover across treatments were not significant. Unfortunately, this is not due to increased turf density. The gains in ryegrass control at 1 WAT 1 applied in late 2014-2015 winter, were lost during the 2015-2016 winter due to bahiagrass turf loss from Application 2 during the 2015 growing season. Thus, caution is advised regarding the application of Derigo at 3 oz/A plus Accord XRT II at 9 fl oz/A on actively growing bahiagrass.

Application Description

	A	B
Application Date:	3/24/15	6/5/15
Time of Day:	2 PM	11:45 AM
Application Method:	SPRAY	SPRAY
Application Timing:	POSPOS	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	VMaddox	VMaddox
Air Temperature, Unit:	71 F	84 F
% Relative Humidity:	70	60
Wind Velocity, Unit:	8 MPH	3 MPH
Wind Direction:	S	E
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	60	20

Derigo for Annual Weed Control on Roadsides (Continued)

Site and Design

Plot Width, Unit: 10 FT Site Type: _____
 Plot Length, Unit: 30 FT Tillage Type: _____
 Replications: 3 Study Design: Randomized Complete Block

Application Equipment

	A	B
Appl. Equipment:	CO2 Backpack	CO2 Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat Fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	3 FT	3 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Tank Mix (Y/N):	Y	Y

Chart 67. Annual ryegrass (*Lolium multiflorum*) cover at the time of application (40%) (0 MAT) and control at 1 MAT.

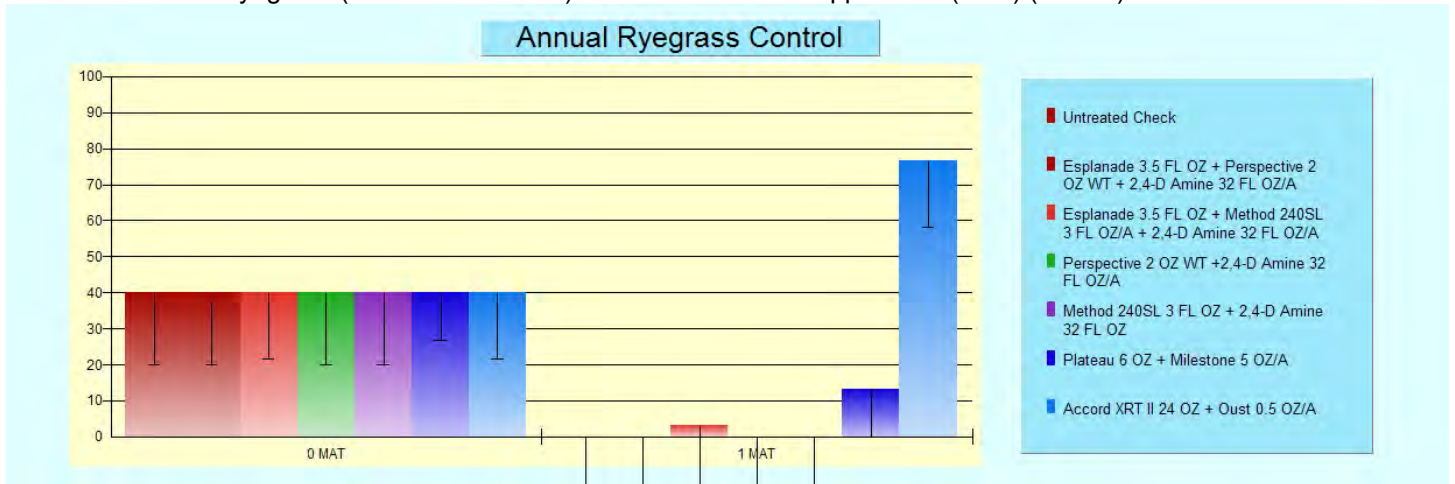
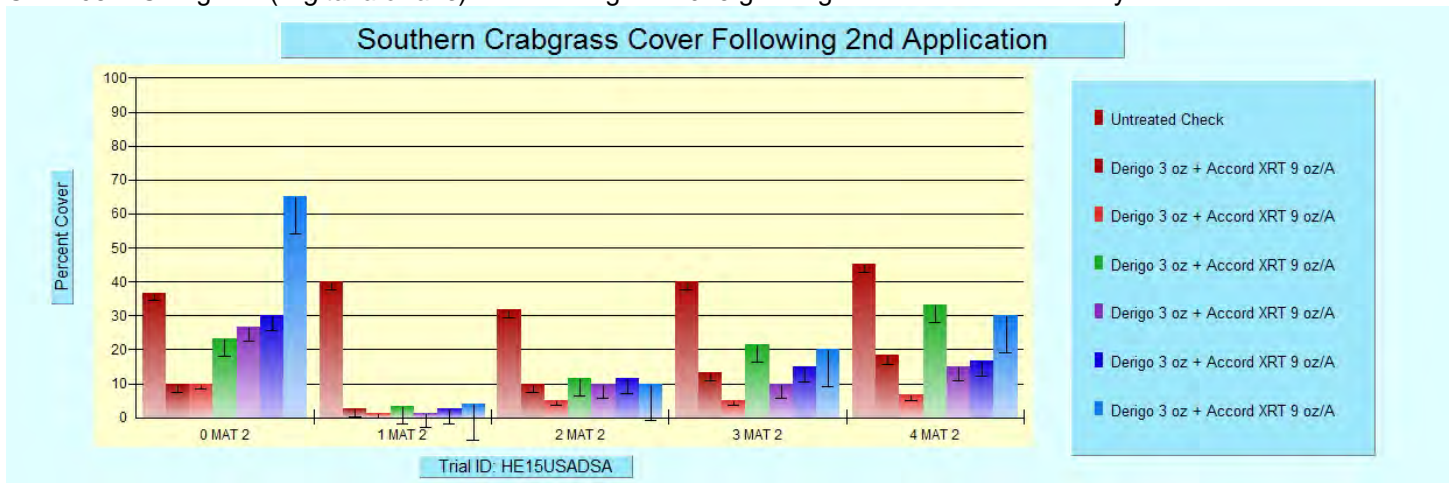


Chart 68. Crabgrass (*Digitaria ciliaris*) cover during the 2015 growing season as influenced by six herbicide treatments.

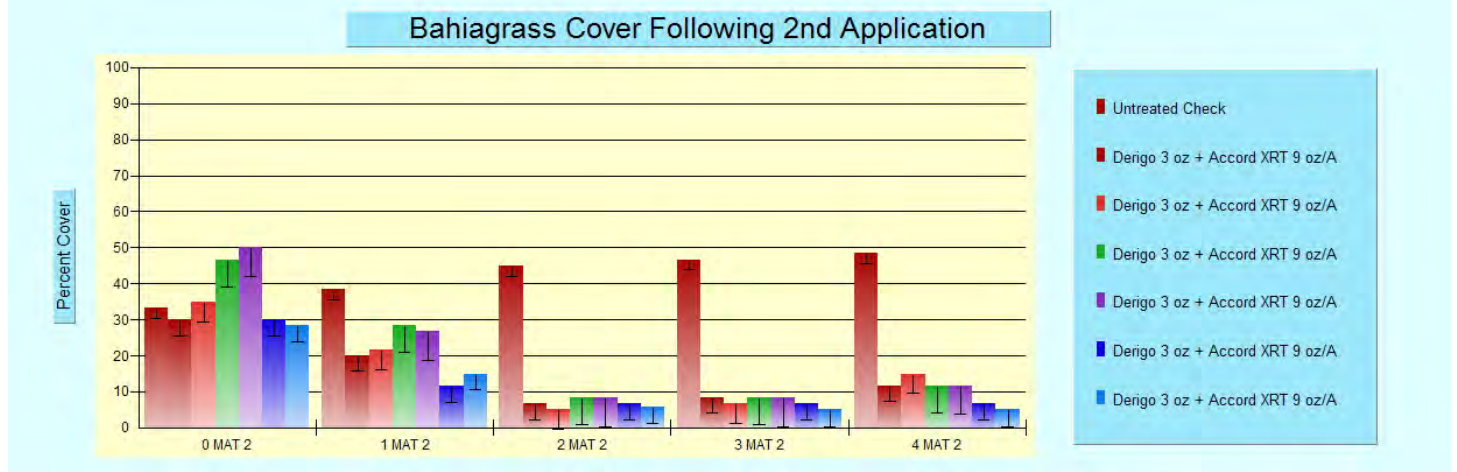


Derigo for Annual Weed Control on Roadsides (Continued)

Reps: 3 Plots: 10 by 30 feet
 Spray vol: 25 gal/ac Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Form Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
01	CHK	Untreated Check						A		101	205	306
02	HERB	Esplanade	1.67	LBA/GAL	SC	3.5	fl oz/a	A	2.188 ml/mx	102	206	303
	HERB	Perspective	55.3	%AW/W	WG	2	oz wt/a	A	1.198 g/mx			
	HERB	2,4-D Amine	4	LBA/GAL	L	32	fl oz/a	A	20.0 ml/mx			
	ADJ	Induce	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
	HERB	Derigo	36.4	%AW/W	WG	3	oz wt/a	B	1.797 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	9	fl oz/a	B	5.625 ml/mx			
	ADJ	COC	100	%	SL	1	% v/v	B	20.0 ml/mx			
03	HERB	Esplanade	1.67	LBA/GAL	SC	3.5	fl oz/a	A	2.188 ml/mx	103	203	307
	HERB	Method 240SL	240	G/L	SL	3	fl oz/a	A	1.875 ml/mx			
	HERB	2,4-D Amine	4	LBA/GAL	L	32	fl oz/a	A	20.0 ml/mx			
	ADJ	Induce	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
	HERB	Derigo	36.4	%AW/W	WG	3	oz ai/a	B	4.938 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	9	fl oz/a	B	5.625 ml/mx			
	ADJ	COC	100	%	SL	1	% v/v	B	20.0 ml/mx			
04	HERB	Perspective	55.3	%AW/W	WG	2	oz wt/a	A	1.198 g/mx	104	202	305
	HERB	2,4-D Amine	4	LBA/GAL	L	32	fl oz/a	A	20.0 ml/mx			
	ADJ	Induce	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
	HERB	Derigo	36.4	%AW/W	WG	3	oz ai/a	B	4.938 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	9	fl oz/a	B	5.625 ml/mx			
	ADJ	COC	100	%	SL	1	% v/v	B	20.0 ml/mx			
05	HERB	Method 240SL	240	G/L	SL	3	fl oz/a	A	1.875 ml/mx	105	201	302
	HERB	2,4-D Amine	4	LBA/GAL	L	32	fl oz/a	A	20.0 ml/mx			
	ADJ	Induce	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
	HERB	Derigo	36.4	%AW/W	WG	3	oz ai/a	B	4.938 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	9	fl oz/a	B	5.625 ml/mx			
	ADJ	COC	100	%	SL	1	% v/v	B	20.0 ml/mx			
6	HERB	Plateau	2	LB/GAL	SL	6	oz/a	A	3.75 ml/mx	106	207	301
	HERB	Milestone	2	LB/GAL	EC	5	oz/a	A	3.125 ml/mx			
	ADJ	Induce	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
	HERB	Derigo	36.4	%AW/W	WG	3	oz ai/a	B	4.938 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	9	fl oz/a	B	5.625 ml/mx			
	ADJ	COC	100	%	SL	1	% v/v	B	20.0 ml/mx			
7	HERB	Accord XRT II	608.4	GA/L	EC	24	oz/a	A	15.0 ml/mx	107	204	304
	HERB	Oust	75	%AW/W	SG	0.5	oz/a	A	0.2996 g/mx			
	ADJ	Induce	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
	HERB	Derigo	36.4	%AW/W	WG	3	oz ai/a	B	4.938 g/mx			
	HERB	Accord XRT	5.4	LB/GAL	SL	9	fl oz/a	B	5.625 ml/mx			
	ADJ	COC	100	%	SL	1	% v/v	B	20.0 ml/mx			

Chart 69. Bahiagrass (*Paspalum notatum*) cover during the 2015 growing season following Application 2 (7 June 2015).

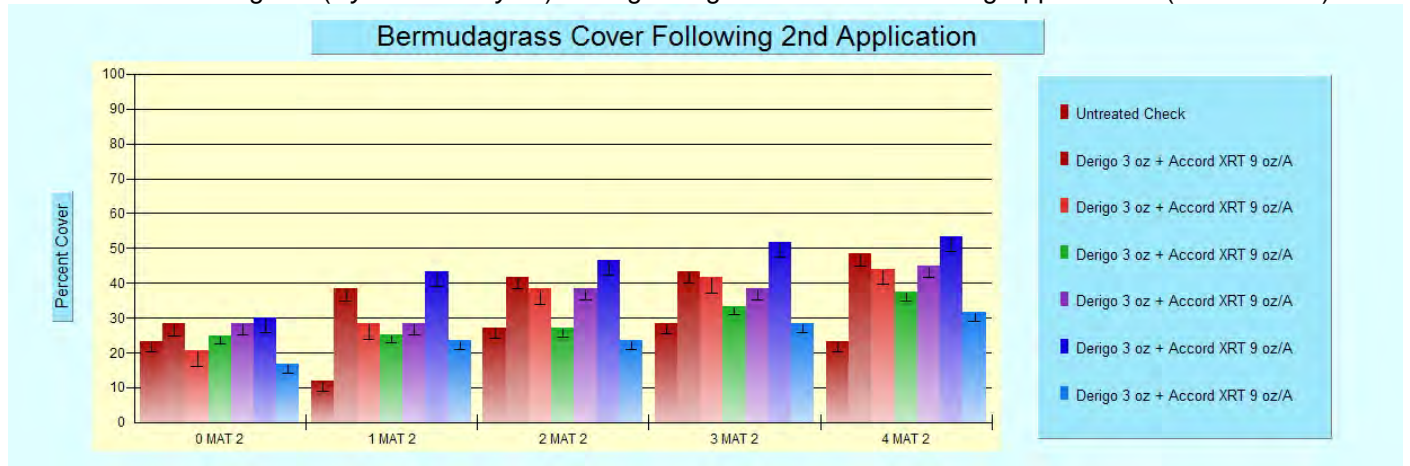


Derigo for Annual Weed Control on Roadsides (Continued)

Pest Name	Italian rye>	Small hop c>	Buckhorn pl>	Carnation c>	Field madder	Blue-stem b>	Common vetch			
Rating Date	3/24/15	3/24/15	3/24/15	3/24/15	3/24/15	3/24/15	3/24/15			
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA			
Trt No.	Treatment Name	Rate	Unit	1	2	3	4	5	6	7
01	Untreated Check			40.0	26.7	1.7	30.0	9.0	1.7	8.3
02	Esplanade	3.5	fl oz/a	40.0	23.3	2.3	33.3	10.7	1.7	6.7
	Perspective	2	oz wt/a							
	2,4-D Amine	32	fl oz/a							
	Induce	0.25	% v/v							
	Derigo	3	oz wt/a							
	Accord XRT	9	fl oz/a							
	COC	1	% v/v							
03	Esplanade	3.5	fl oz/a	40.0	26.7	0.0	30.0	5.0	3.0	7.3
	Method 240SL	3	fl oz/a							
	2,4-D Amine	32	fl oz/a							
	Induce	0.25	% v/v							
	Derigo	3	oz ai/a							
	Accord XRT	9	fl oz/a							
	COC	1	% v/v							
04	Perspective	2	oz wt/a	40.0	26.7	0.7	26.7	10.0	4.0	8.3
	2,4-D Amine	32	fl oz/a							
	Induce	0.25	% v/v							
	Derigo	3	oz ai/a							
	Accord XRT	9	fl oz/a							
	COC	1	% v/v							
05	Method 240SL	3	fl oz/a	40.0	30.0	1.7	26.7	8.3	4.0	8.3
	2,4-D Amine	32	fl oz/a							
	Induce	0.25	% v/v							
	Derigo	3	oz ai/a							
	Accord XRT	9	fl oz/a							
	COC	1	% v/v							
6	Plateau	6	oz/a	40.0	26.7	0.7	36.7	6.7	1.7	8.3
	Milestone	5	oz/a							
	Induce	0.25	% v/v							
	Derigo	3	oz ai/a							
	Accord XRT	9	fl oz/a							
	COC	1	% v/v							
7	Accord XRT II	24	oz/a	40.0	26.7	0.7	31.7	10.0	3.0	6.7
	Oust	0.5	oz/a							
	Induce	0.25	% v/v							
	Derigo	3	oz ai/a							
	Accord XRT	9	fl oz/a							
	COC	1	% v/v							
LSD (P=Various)				0.00	8.54	2.03	9.38	6.31	3.13	4.13
Standard Deviation				0.00	4.80	1.14	5.27	3.55	1.76	2.32
CV				0.0	17.99	104.17	17.16	41.62	64.82	30.09
Bartlett's X2				0.0	0.0	3.644	3.148	4.955	1.547	0.805
P(Bartlett's X2)				.	1.00	0.602	0.677	0.55	0.956	0.992
Replicate F				0.000	2.690	14.744	11.700	18.628	5.954	7.237
Replicate Prob(F)				1.0000	0.1084	0.0006	0.0015	0.0002	0.0160	0.0087
Treatment F				0.000	0.483	1.512	1.386	0.996	1.092	0.359
Treatment Prob(F)				1.0000	0.8090	0.2549	0.2963	0.4703	0.4201	0.8909

Means followed by same letter do not differ significantly.

Chart 70. Bermudagrass (*Cynodon dactylon*) 2015 growing season cover following Application 2 (7 June 2015).



Derigo for Annual Weed Control on Roadsides (Continued)

Pest Name		Downy brome	Carolina ge>	Hairyfruit >	Italian rye>	Small hop c>	Buckhorn pl>	Carnation c>		
Rating Date		3/24/15	3/24/15	3/24/15	4/23/15	4/23/15	4/23/15	4/23/15		
Rating Data Type		GROUND	GROUND	GROUND	CONTRO	CONTRO	CONTRO	CONTRO		
Rating Unit		%AREA	%AREA	%AREA	%	%	%	%		
Trt No.	Treatment Name	Rate	Unit	8	9	10	11	12	13	14
01	Untreated Check			8.3	3.0	3.0	0.0	0.0	0.0	0.0
02	Esplanade	3.5 fl oz/a		8.3	4.0	3.3	0.0 b	99.7 ab	100.0	98.0 ab
	Perspective	2 oz wt/a								
	2,4-D Amine	32 fl oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz wt/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
03	Esplanade	3.5 fl oz/a		8.3	3.3	2.0	3.3 b	100.0 a	.	100.0 a
	Method 240SL	3 fl oz/a								
	2,4-D Amine	32 fl oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
04	Perspective	2 oz wt/a		8.3	3.3	2.0	0.0 b	96.7 ab	100.0	96.7 ab
	2,4-D Amine	32 fl oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
05	Method 240SL	3 fl oz/a		8.3	5.0	2.3	0.0 b	86.7 d	60.0	94.7 b
	2,4-D Amine	32 fl oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
6	Plateau	6 oz/a		8.3	4.0	5.7	13.3 b	95.0 bc	5.0	96.7 ab
	Milestone	5 oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
7	Accord XRT II	24 oz/a		8.3	3.0	2.3	76.7 a	91.7 c	60.0	86.7 c
	Oust	0.5 oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
LSD (P=Various)				0.00	2.68	3.56	18.09	4.89	.	5.08
Standard Deviation				0.00	1.51	2.00	9.94	2.69	.	2.79
CV				0.0	41.09	67.74	63.93	2.83	.	2.92
Bartlett's X2				0.0	0.072	8.679	4.846	6.305	.	1.744
P(Bartlett's X2)				1.00	1.00	0.192	0.089	0.098	.	0.783
Mean Sep. Test							LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				0.000	1.343	1.083	1.067	1.969		4.929
Replicate Prob(F)				1.0000	0.2977	0.3694	0.3800	0.1901		0.0324
Treatment F				0.000	0.685	1.262	28.000	10.808		8.314
Treatment Prob(F)				1.0000	0.6655	0.3434	0.0001	0.0009		0.0025

Means followed by same letter do not differ significantly.

Derigo for Annual Weed Control on Roadsides (Continued)

Pest Name	Field madder	Common vetch	Carolina ge>	Hairyfruit >	Buckhorn pl>	Buckhorn pl>	CYNDA BGRM Bermuda gra>
Crop Code							
BBCH Scale							
Crop Name							
Rating Date	4/23/15	4/23/15	4/23/15	4/23/15	5/22/15	6/5/15	6/5/15
Rating Data Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	GROUND	GROUND
Rating Unit	%	%	%	%	%	%AREA	%AREA
Trt Treatment							
No. Name							
Rate							
Unit							
15		16	17	18	19	20	21
01 Untreated Check	0.0	0.0	0.0	0.0	0.0	4.0	23.3 a
02 Esplanade	100.0 a	100.0 a	100.0 a	93.3 a	100.0	0.0	28.3 a
Perspective							
2,4-D Amine							
Induce							
Derigo							
Accord XRT							
COC							
03 Esplanade	100.0 a	100.0 a	100.0 a	99.7 a	.	0.0	20.7 a
Method 240SL							
2,4-D Amine							
Induce							
Derigo							
Accord XRT							
COC							
04 Perspective	100.0 a	100.0 a	100.0 a	100.0 a	100.0	0.0	25.0 a
2,4-D Amine							
Induce							
Derigo							
Accord XRT							
COC							
05 Method 240SL	100.0 a	93.3 ab	91.7 a	90.0 a	100.0	0.0	28.3 a
2,4-D Amine							
Induce							
Derigo							
Accord XRT							
COC							
6 Plateau	100.0 a	86.7 b	60.0 b	46.7 b	0.0	3.0	30.0 a
Milestone							
Induce							
Derigo							
Accord XRT							
COC							
7 Accord XRT II	100.0 a	73.3 c	53.3 b	100.0 a	100.0	0.0	16.7 a
Oust							
Induce							
Derigo							
Accord XRT							
COC							
LSD (P=Various)	0.00	12.72	27.94	31.49	.	3.56	17.95
Standard Deviation	0.00	6.99	15.36	16.72	.	2.00	10.09
CV	0.0	7.58	18.25	18.94	.	200.0	40.99
Bartlett's X2	0.0	0.0	1.88	7.679	.	2.029	2.598
P(Bartlett's X2)	.	0.001*	0.391	0.053	.	0.154	0.857
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05		LSD.05
Replicate F	0.000	3.182	1.113	0.173		1.750	4.260
Replicate Prob(F)	1.0000	0.0852	0.3661	0.8442		0.2153	0.0400
Treatment F	0.000	7.000	5.961	4.644		2.250	0.674
Treatment Prob(F)	1.0000	0.0047	0.0083	0.0276		0.1093	0.6736

Means followed by same letter do not differ significantly.

Derigo for Annual Weed Control on Roadsides (Continued)

Pest Name	Blue-stem b>	PASNO BGRM Bahigrass	DDigitaria >	overall	PASNO BGRM Bahigrass	PASNO BGRM Bahigrass	CYNDA BGRM Bermuda gra>	CYNDA BGRM Bermuda gra>	
Crop Code									
BBCH Scale									
Crop Name									
Rating Date	6/5/15	6/5/15	6/5/15	7/6/15	7/6/15	7/6/15	7/6/15	7/6/15	
Rating Data Type	GROUND	GROUND	GROUND	GROUND	CONTRO	COLOR	CONTRO	COLOR	
Rating Unit	%AREA	%AREA	%AREA	%AREA	%	1-9	%	1-9	
Trt Treatment	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	
No. Name	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit	
01 Untreated Check		6.0 a	33.3 a	36.7 b	86.7 a	0.0	7.0	0.0	7.0 a
02 Esplanade	3.5 fl oz/a	5.7 a	30.0 a	10.0 c	53.3 b	66.7 bc	2.7 a	6.7 a	6.7 a
Perspective	2 oz wt/a								
2,4-D Amine	32 fl oz/a								
Induce	0.25 % v/v								
Derigo	3 oz wt/a								
Accord XRT	9 fl oz/a								
COC	1 % v/v								
03 Esplanade	3.5 fl oz/a	3.3 a	35.0 a	10.0 c	50.0 b	60.0 c	4.0 a	6.7 a	6.3 a
Method 240SL	3 fl oz/a								
2,4-D Amine	32 fl oz/a								
Induce	0.25 % v/v								
Derigo	3 oz ai/a								
Accord XRT	9 fl oz/a								
COC	1 % v/v								
04 Perspective	2 oz wt/a	5.7 a	46.7 a	23.3 bc	53.3 b	60.0 c	4.0 a	6.7 a	6.7 a
2,4-D Amine	32 fl oz/a								
Induce	0.25 % v/v								
Derigo	3 oz ai/a								
Accord XRT	9 fl oz/a								
COC	1 % v/v								
05 Method 240SL	3 fl oz/a	4.0 a	50.0 a	26.7 b	60.0 b	60.0 c	4.0 a	6.7 a	6.7 a
2,4-D Amine	32 fl oz/a								
Induce	0.25 % v/v								
Derigo	3 oz ai/a								
Accord XRT	9 fl oz/a								
COC	1 % v/v								
6 Plateau	6 oz/a	3.0 a	30.0 a	30.0 b	56.7 b	81.7 a	4.0 a	6.7 a	6.7 a
Milestone	5 oz/a								
Induce	0.25 % v/v								
Derigo	3 oz ai/a								
Accord XRT	9 fl oz/a								
COC	1 % v/v								
7 Accord XRT II	24 oz/a	0.7 a	28.3 a	65.0 a	46.7 b	76.7 ab	4.0 a	10.0 a	6.0 a
Oust	0.5 oz/a								
Induce	0.25 % v/v								
Derigo	3 oz ai/a								
Accord XRT	9 fl oz/a								
COC	1 % v/v								
LSD (P=Various)		4.07	15.63	14.83	14.09	10.63	1.72	4.89	0.90
Standard Deviation		2.29	8.79	8.33	7.92	5.85	0.94	2.69	0.50
CV		56.54	24.28	28.93	13.63	8.66	24.96	37.21	7.67
Bartlett's X2		4.189	3.965	2.265	3.306	3.126	0.0	0.0	0.0
P(Bartlett's X2)		0.651	0.681	0.687	0.653	0.209	.	1.00	1.00
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		5.709	17.321	4.440	7.823	0.122	1.000	0.769	0.563
Replicate Prob(F)		0.0181	0.0003	0.0360	0.0067	0.8865	0.4019	0.4889	0.5841
Treatment F		2.109	2.905	15.229	8.481	7.976	1.000	0.769	1.188
Treatment Prob(F)		0.1278	0.0548	0.0001	0.0009	0.0029	0.4651	0.5927	0.3753

Means followed by same letter do not differ significantly.

Derigo for Annual Weed Control on Roadsides (Continued)

Pest Name	DDigitaria >	Blue-stem b>	Buckhorn pl>	CYNDA BGRM Bermuda gra> 7/6/15 GROUND %AREA	PASNO BGRM Bahigrass 7/6/15 GROUND %AREA	DDigitaria > 7/6/15 GROUND %AREA	overall 8/5/15 GROUND %AREA	PASNO BGRM Bahigrass 8/5/15 CONTRO %
Trt Treatment	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate
No. Name	Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit
01 Untreated Check				12.0 a	38.3 a	40.0 a	90.0 a	0.0
02 Esplanade	3.5 fl oz/a	95.7 a	61.7 a	38.3 a	20.0 bc	2.7 b	50.0 b	93.3 a
Perspective	2 oz wt/a							
2,4-D Amine	32 fl oz/a							
Induce	0.25 % v/v							
Derigo	3 oz wt/a							
Accord XRT	9 fl oz/a							
COC	1 % v/v							
03 Esplanade	3.5 fl oz/a	99.7 a	55.0 a	28.3 a	21.7 bc	1.3 b	41.7 b	95.0 a
Method 240SL	3 fl oz/a							
2,4-D Amine	32 fl oz/a							
Induce	0.25 % v/v							
Derigo	3 oz ai/a							
Accord XRT	9 fl oz/a							
COC	1 % v/v							
04 Perspective	2 oz wt/a	98.7 a	36.7 a	25.3 a	28.3 ab	3.3 b	38.3 b	93.3 a
2,4-D Amine	32 fl oz/a							
Induce	0.25 % v/v							
Derigo	3 oz ai/a							
Accord XRT	9 fl oz/a							
COC	1 % v/v							
05 Method 240SL	3 fl oz/a	99.0 a	40.0 a	100.0	28.3 a	26.7 b	1.3 b	45.0 b
2,4-D Amine	32 fl oz/a							
Induce	0.25 % v/v							
Derigo	3 oz ai/a							
Accord XRT	9 fl oz/a							
COC	1 % v/v							
6 Plateau	6 oz/a	96.0 a	46.7 a	30.0	43.3 a	11.7 c	2.7 b	51.7 b
Milestone	5 oz/a							
Induce	0.25 % v/v							
Derigo	3 oz ai/a							
Accord XRT	9 fl oz/a							
COC	1 % v/v							
7 Accord XRT II	24 oz/a	95.3 a	70.0 a	100.0	23.7 a	15.0 c	4.0 b	36.7 b
Oust	0.5 oz/a							
Induce	0.25 % v/v							
Derigo	3 oz ai/a							
Accord XRT	9 fl oz/a							
COC	1 % v/v							
LSD (P=Various)		3.63	30.89	.	24.72	10.39	10.76	30.26
Standard Deviation		1.97	16.00	.	13.90	5.84	6.05	17.01
CV		2.02	30.96	.	48.8	25.29	76.49	33.7
Bartlett's X2		8.972	5.333	.	1.985	4.292	26.179	0.629
P(Bartlett's X2)		0.062	0.255	.	0.921	0.637	0.001*	0.987
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		2.889	2.165		7.935	8.407	2.881	4.658
Replicate Prob(F)		0.1074	0.1854		0.0064	0.0052	0.0951	0.0318
Treatment F		2.838	1.953		1.612	7.035	16.516	3.473
Treatment Prob(F)		0.0827	0.2034		0.2267	0.0022	0.0001	0.0316

Means followed by same letter do not differ significantly.

Derigo for Annual Weed Control on Roadsides (Continued)

Pest Name		PASNO	CYNDA	CYNDA	DDigitaria >	DDigitaria >	overall	PASNO	PASNO		
Crop Code		BGRM	BGRM	BGRM				BGRM	BGRM		
BBCH Scale		Bahiagrass	Bermuda gra>	Bermuda gra>				Bahiagrass	Bahiagrass		
Crop Name		8/5/15	8/5/15	8/5/15	8/5/15	8/5/15	9/4/15	9/4/15	9/4/15		
Rating Date		GROUND	CONTRO	GROUND	CONTRO	GROUND	GROUND	CONTRO	GROUND		
Rating Data Type		%AREA	%	%AREA	%	%AREA	%AREA	%	%AREA		
Rating Unit											
Trt No.	Treatment Name	Rate	Unit								
01	Untreated Check			45.0 a	0.0	27.0 a	0.0	31.7 a	90.0 a	0.0	46.7 a
02	Esplanade	3.5 fl oz/a		6.7 b	0.0	41.7 a	90.0 a	10.0 a	58.3 bc	91.7 a	8.3 b
	Perspective	2 oz wt/a									
	2,4-D Amine	32 fl oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz wt/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
03	Esplanade	3.5 fl oz/a		5.0 b	0.0	38.3 a	95.0 a	5.0 a	48.3 c	93.3 a	6.7 b
	Method 240SL	3 fl oz/a									
	2,4-D Amine	32 fl oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
04	Perspective	2 oz wt/a		8.3 b	0.0	27.0 a	85.0 a	11.7 a	65.0 bc	91.7 a	8.3 b
	2,4-D Amine	32 fl oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
05	Method 240SL	3 fl oz/a		8.3 b	0.0	38.3 a	90.0 a	10.0 a	56.7 bc	91.7 a	8.3 b
	2,4-D Amine	32 fl oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
6	Plateau	6 oz/a		6.7 b	0.0	46.7 a	88.3 a	11.7 a	70.0 ab	93.3 a	6.7 b
	Milestone	5 oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
7	Accord XRT II	24 oz/a		5.7 b	0.0	23.7 a	90.0 a	10.0 a	58.3 bc	95.0 a	5.0 b
	Oust	0.5 oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
LSD (P=Various)		9.21	0.00	37.22	9.35	17.42	20.50	3.95	7.52		
Standard Deviation		5.18	0.00	20.92	5.14	9.79	11.52	2.17	4.23		
CV		42.32	0.0	60.35	5.73	76.14	18.06	2.34	32.87		
Bartlett's X2		9.304	0.0	0.232	4.604	11.79	5.51	0.0	8.331		
P(Bartlett's X2)		0.098	.	1.00	0.203	0.019*	0.357	1.00	0.139		
Mean Sep. Test		LSD.05		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05		
Replicate F		2.378	0.000	5.727	3.842	3.130	5.175	3.824	3.800		
Replicate Prob(F)		0.1350	1.0000	0.0179	0.0578	0.0805	0.0240	0.0584	0.0527		
Treatment F		23.520	0.000	0.524	1.189	2.311	4.054	1.176	37.600		
Treatment Prob(F)		0.0001	1.0000	0.7801	0.3799	0.1023	0.0188	0.3852	0.0001		

Means followed by same letter do not differ significantly.

Derigo for Annual Weed Control on Roadsides (Continued)

Pest Name		CYNDA BGRM	CYNDA BGRM	DDigitaria >	DDigitaria >	overall	PASNO BGRM	PASNO BGRM	CYNDA BGRM	
Crop Code		Bermuda gra>	Bermuda gra>	9/4/15	9/4/15	10/5/15	Bahiagrass	Bahiagrass	Bermuda gra>	
BBCH Scale		9/4/15	9/4/15	9/4/15	9/4/15	10/5/15	10/5/15	10/5/15	10/5/15	
Crop Name		CONTRO	GROUND	CONTRO	GROUND	GROUND	CONTRO	GROUND	CONTRO	
Rating Date		%	%AREA	%	%AREA	%AREA	%	%AREA	%	
Rating Data Type										
Rating Unit										
Trt	Treatment	Rate	Unit							
No.	Name									
01	Untreated Check	0.0		28.3 a	0.0	40.0 a	95.0 a	0.0	48.3 a	0.0
02	Esplanade	3.5 fl oz/a		43.3 a	86.7 a	13.3 b	66.7 b	85.0 a	11.7 bc	0.0
	Perspective	2 oz wt/a								
	2,4-D Amine	32 fl oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz wt/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
03	Esplanade	3.5 fl oz/a		41.7 a	95.0 a	5.0 b	55.0 b	75.0 a	15.0 b	0.0
	Method 240SL	3 fl oz/a								
	2,4-D Amine	32 fl oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
04	Perspective	2 oz wt/a		33.3 a	78.3 a	21.7 ab	70.0 b	85.0 a	11.7 bc	0.0
	2,4-D Amine	32 fl oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
05	Method 240SL	3 fl oz/a		38.3 a	90.0 a	10.0 b	61.7 b	85.0 a	11.7 bc	0.0
	2,4-D Amine	32 fl oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
6	Plateau	6 oz/a		51.7 a	85.0 a	15.0 b	73.3 b	93.3 a	6.7 bc	0.0
	Milestone	5 oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
7	Accord XRT II	24 oz/a		28.3 a	80.0 a	20.0 ab	61.7 b	95.0 a	5.0 c	0.0
	Oust	0.5 oz/a								
	Induce	0.25 % v/v								
	Derigo	3 oz ai/a								
	Accord XRT	9 fl oz/a								
	COC	1 % v/v								
LSD (P=Various)		0.00		38.83	14.09	20.02	20.64	15.90	8.65	0.00
Standard Deviation		0.00		21.83	7.75	11.25	11.60	8.74	4.86	0.00
CV		0.0		57.65	9.02	63.01	16.8	10.12	30.92	0.0
Bartlett's X2		0.0		0.443	4.255	7.641	6.012	5.112	3.432	0.0
P(Bartlett's X2)		.		0.998	0.235	0.106	0.305	0.276	0.634	.
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	
Replicate F		0.000		6.665	1.944	2.821	5.956	8.855	13.765	0.000
Replicate Prob(F)		1.0000		0.0113	0.1935	0.0990	0.0160	0.0061	0.0008	1.0000
Treatment F		0.000		0.459	1.931	3.022	3.735	2.025	27.748	0.000
Treatment Prob(F)		1.0000		0.8255	0.1759	0.0487	0.0249	0.1601	0.0001	1.0000

Means followed by same letter do not differ significantly.

Derigo for Annual Weed Control on Roadsides (Continued)

Pest Name		DDigitaria >	DDigitaria >	Blue-stem b>	overall	Italian rye>	overall	PASNO			
Crop Code	CYND							BGRM			
BBCH Scale	BGRM							Bahiagrass			
Crop Name	Bermuda gra>	10/5/15	10/5/15	10/5/15	12/4/15	12/4/15	6/7/16	6/7/16			
Rating Date	10/5/15	CONTRO	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Data Type	GROUND	%	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA			
Rating Unit	%AREA										
Trt	Treatment	Rate	Unit								
No.	Name	Rate	Unit	54	55	56	57	58	59	60	61
01	Untreated Check			23.3 a	0.0	45.0 a	10.7 a	91.7 a	36.7 a	53.3 a	23.3 a
02	Esplanade	3.5 fl oz/a		48.3 a	81.7 a	18.3 a	1.3 a	83.3 a	53.3 a	50.0 a	6.7 a
	Perspective	2 oz wt/a									
	2,4-D Amine	32 fl oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz wt/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
03	Esplanade	3.5 fl oz/a		44.0 a	93.3 a	6.7 a	0.3 a	71.7 a	43.3 a	41.7 a	4.0 a
	Method 240SL	3 fl oz/a									
	2,4-D Amine	32 fl oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
04	Perspective	2 oz wt/a		37.3 a	63.3 a	33.3 a	2.0 a	83.3 a	63.3 a	43.3 a	5.0 a
	2,4-D Amine	32 fl oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
05	Method 240SL	3 fl oz/a		45.0 a	85.0 a	15.0 a	1.7 a	83.3 a	63.3 a	31.7 a	9.0 a
	2,4-D Amine	32 fl oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
6	Plateau	6 oz/a		53.3 a	80.0 a	16.7 a	0.3 a	80.0 a	56.7 a	50.0 a	5.0 a
	Milestone	5 oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
7	Accord XRT II	24 oz/a		31.7 a	66.7 a	30.0 a	0.0 a	73.3 a	43.3 a	35.0 a	4.0 a
	Oust	0.5 oz/a									
	Induce	0.25 % v/v									
	Derigo	3 oz ai/a									
	Accord XRT	9 fl oz/a									
	COC	1 % v/v									
LSD (P=Various)				41.87	22.22	25.54	7.91	14.51	21.67	30.70	16.37
Standard Deviation				23.53	12.21	14.36	4.44	8.15	12.18	17.26	9.20
CV				58.21	15.59	60.91	190.44	10.07	23.69	39.61	112.99
Bartlett's X2				0.258	8.031	6.694	22.801	7.153	7.197	2.751	17.054
P(Bartlett's X2)				1.00	0.09	0.153	0.001*	0.307	0.303	0.839	0.002*
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				4.976	1.089	1.923	2.795	15.063	7.027	2.674	0.977
Replicate Prob(F)				0.0267	0.3732	0.1886	0.1008	0.0005	0.0095	0.1095	0.4045
Treatment F				0.579	2.592	2.499	2.138	2.084	2.235	0.666	1.699
Treatment Prob(F)				0.7407	0.0938	0.0835	0.1237	0.1315	0.1111	0.6789	0.2044

Means followed by same letter do not differ significantly.

Derigo for Annual Weed Control on Roadsides (Continued)

Pest Name		Blue-stem b>	Buckhorn pl>	Canada hors>			
Crop Code	CYNDA						
BBCH Scale	BGRM						
Crop Name	Bermuda gra>						
Rating Date	6/7/16	6/7/16	6/7/16	6/7/16			
Rating Data Type	GROUND	GROUND	GROUND	GROUND			
Rating Unit	%AREA	%AREA	%AREA	%AREA			
Trt No.	Treatment Name	Rate	Unit	62	63	64	65
01	Untreated Check			18.3 a	5.7 a	8.3 a	9.0 a
02	Esplanade	3.5 fl oz/a		40.0 a	1.7 a	0.0 a	5.7 a
	Perspective	2 oz wt/a					
	2,4-D Amine	32 fl oz/a					
	Induce	0.25 % v/v					
	Derigo	3 oz wt/a					
	Accord XRT	9 fl oz/a					
	COC	1 % v/v					
03	Esplanade	3.5 fl oz/a		30.0 a	0.0 a	0.0 a	10.0 a
	Method 240SL	3 fl oz/a					
	2,4-D Amine	32 fl oz/a					
	Induce	0.25 % v/v					
	Derigo	3 oz ai/a					
	Accord XRT	9 fl oz/a					
	COC	1 % v/v					
04	Perspective	2 oz wt/a		30.7 a	1.7 a	0.7 a	8.3 a
	2,4-D Amine	32 fl oz/a					
	Induce	0.25 % v/v					
	Derigo	3 oz ai/a					
	Accord XRT	9 fl oz/a					
	COC	1 % v/v					
05	Method 240SL	3 fl oz/a		21.7 a	3.3 a	3.3 a	6.7 a
	2,4-D Amine	32 fl oz/a					
	Induce	0.25 % v/v					
	Derigo	3 oz ai/a					
	Accord XRT	9 fl oz/a					
	COC	1 % v/v					
6	Plateau	6 oz/a		38.3 a	0.7 a	2.3 a	8.3 a
	Milestone	5 oz/a					
	Induce	0.25 % v/v					
	Derigo	3 oz ai/a					
	Accord XRT	9 fl oz/a					
	COC	1 % v/v					
7	Accord XRT II	24 oz/a		20.0 a	1.7 a	0.7 a	11.7 a
	Oust	0.5 oz/a					
	Induce	0.25 % v/v					
	Derigo	3 oz ai/a					
	Accord XRT	9 fl oz/a					
	COC	1 % v/v					
LSD (P=Various)		32.90		4.26	8.77	9.46	
Standard Deviation		18.49		2.39	4.93	5.32	
CV		65.06		114.25	225.12	62.38	
Bartlett's X2		1.245		2.245	11.514	3.203	
P(Bartlett's X2)		0.975		0.814	0.021*	0.783	
Mean Sep. Test		LSD.05		LSD.05	LSD.05	LSD.05	
Replicate F		2.818		2.900	0.196	5.237	
Replicate Prob(F)		0.0992		0.0939	0.8247	0.0232	
Treatment F		0.670		1.856	1.096	0.424	
Treatment Prob(F)		0.6764		0.1704	0.4183	0.8494	

Means followed by same letter do not differ significantly.

Derigo for Annual Weed Control on Roadsides (Continued)

Chart 71. Bahiagrass (*Paspalum notatum*) cover one year after Application 2 (7 June 2016).

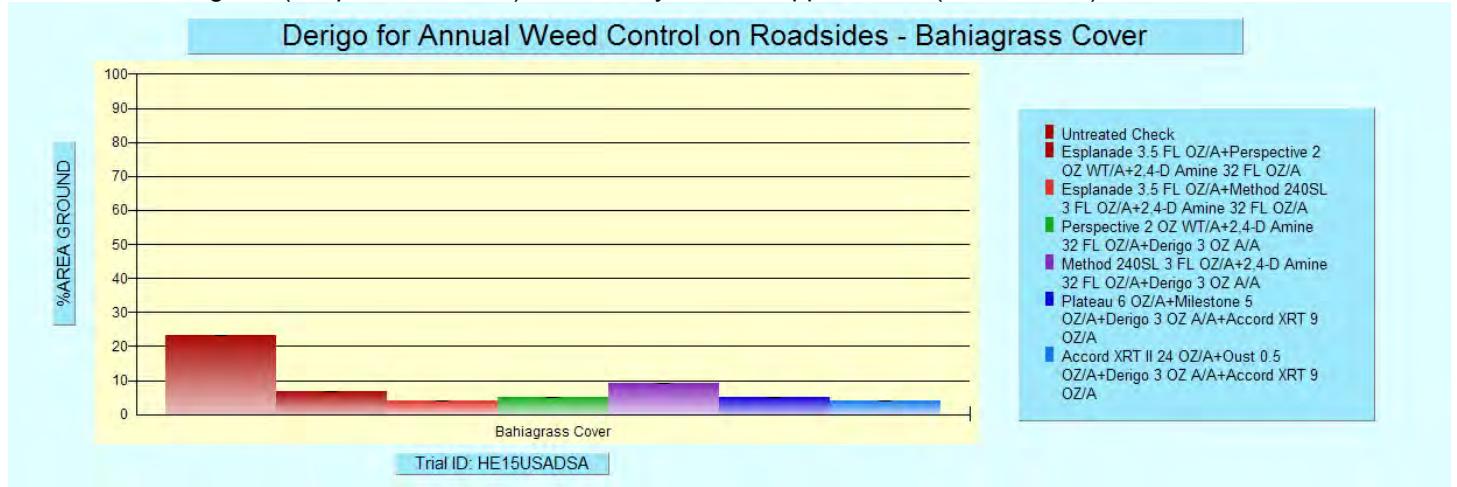


Chart 72. Bermudagrass (*Cynodon dactylon*) cover one year after Applications 2 (7 June 2016).

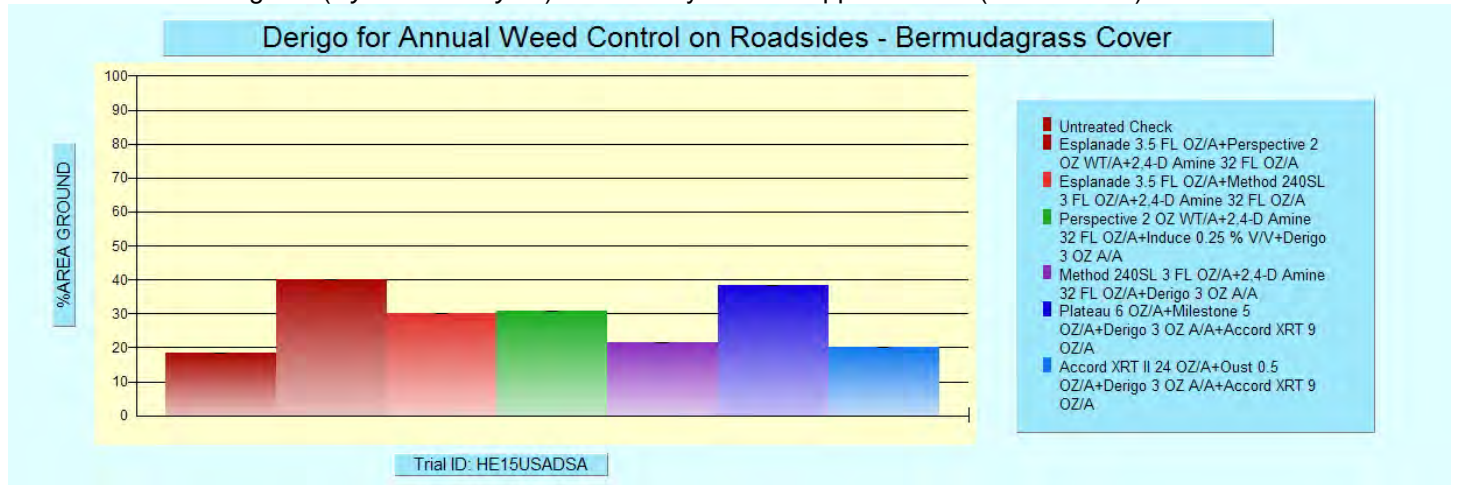
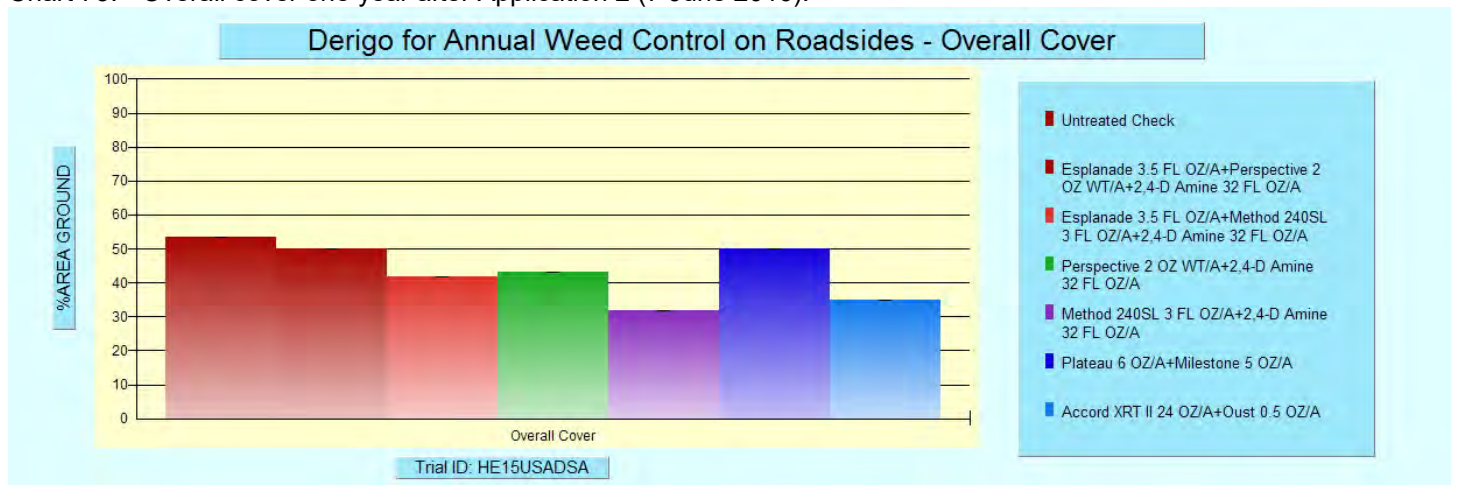


Chart 73. Overall cover one year after Application 2 (7 June 2016).



2015 IVM - Oversight and Milestone in MS DOT Standards Trial

Protocol ID: Dow_standards
 Location: Meridian, MS

Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Affiliation: MSU
Investigator: John Byrd

Title: _____
Title: _____

Trial Location

City: Meridian
State/Prov.: MS

Trial Status: Completed
Trial Reliability: _____

Conducted Under GLP:
Conducted Under GEP: X

Official Trial Code: _____
Other Trial Code: _____

Site and Design

Plot Width, Unit: 10 FT
Plot Length, Unit: 30 FT
Replications: 3

Site Type: _____
Tillage Type: _____
Study Design: Randomized Complete Block

Application Description

	A	B
Application Date:	3/24/15	6/5/15
Time of Day:	12:05 PM	1:00 PM
Application Method:	SPRAY	SPRAY
Application Timing:	POSPOS	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	VMaddox	VMaddox
Air Temperature, Unit:	67 F	84 F
% Relative Humidity:	70	60
Wind Velocity, Unit:	8 MPH	5 MPH
Wind Direction:	S	NE
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	60	20

Application Equipment

	A	B
Appl. Equipment:	CO2 Backpack	CO2 Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Tank Mix (Y/N):	Y	Y

2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Results and Conclusions:

This study is part of a two application study as noted on page 135, with a total of 10 treatments. This section covers the results of the first application in the study which includes treatments 1, 2, 3 and 10. The untreated check is treatment 10 for both studies, which was rated on the same days and times as other treatments with which it was compared. Data recorded on 5 June 2015 should be disregarded as it is baseline (0 DAT 2) data for the second application, as well as other data blanks included in the tables.

Cool-Season Weed Response.

At 0 DAT, annual ryegrass (*Lolium multiflorum*), crimson clover (*Trifolium incarnatum*), and small hop clover (*Trifolium dubium*) were the primary species in the plots, respectively. Other weeds were present and rated at 0 DAT, but populations were small.

At 30 DAT ryegrass control ranged from 73.3 to 80 percent and was not significantly different for treated plots (Chart 74). Treatments with Milestone and Opensight were significantly better for controlling both crimson and small hop clovers at 30 DAT. Although there was less cover of buckhorn plantain (*Plantago lanceolata*) in treated plots, it was not significant compared to the untreated at 3 MAT.

At 1 YAT, ryegrass cover across all treatments was not significantly different. This was also true for Carolina geranium (*Geranium carolinianum*), crimson clover, buckhorn plantain, and small hop clover. There was a trend toward higher ryegrass and small hop clover cover in the treatment with Oust.

Turfgrass Response.

No turfgrass control was observed at 1 WAT (31 March 2015) (data not shown), but discoloration was very noticeable in all treated plots. At 3 MAT, bermudagrass (*Cynodon dactylon*) average cover was similar in all treatments (Chart 75). However, there was a significant reduction in cover for bahiagrass (*Paspalum notatum*) plots that were treated (Chart 76). This is likely due to glyphosate in the treatments, although cover in treatments with Opensight or Oust was significantly lower compared to the treatment with Milestone. This may indicate bahiagrass had additional sensitivity to sulfonyl urea herbicides in this study.

Warm-Season Weed Response.

At 3 MAT, crabgrass (*Digitaria ciliaris*) cover was higher in herbicide treated plots compared to the untreated check, although differences were not significant (Chart 77). Although there was less cover of broomsedge (*Andropogon virginicus*) in treated plots, it was not significant compared to the untreated at 3 MAT and 1 YAT. However, there was a significant reduction in horseweed (*Conyza canadensis*) cover in treated plots compared to the check. At 1 YAT, there was no significant difference in horseweed cover but an opposite trend with the lowest cover in the untreated plots.

Overall Cover.

Overall cover at 3 MAT was similar across all treatments. However, at 1 YAT overall cover in treated plots was significantly less compared to the untreated plots (Chart 78). This is possibly due to the collective reduction in weed cover in treated plots, even though they were not individually significant.

Overall Conclusions.

There was significant control of some species during the first growing season following applications. However, little was observed by the beginning of the following growing season and it is likely re-applications would be required to maintain control, particularly for annual ryegrass (Chart 79).

2015 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
 Location: Meridian, MS

Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

Reps: 3 Plots: 10 by 30 feet
 Spray vol: 25 gal/ac Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Milestone	2	LB/GAL	SL	7	fl oz/a	A	4.375 ml/mx	101	207	303
	HERB	Accord	4	LB/GAL	SL	12.8	fl oz/a	A	8.0 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	Oversight	61.95	%AEW/W	WG	3.3	oz wt/a	A	1.977 g/mx	102	204	305
	HERB	Accord	4	LB/GAL	SL	12.8	fl oz/a	A	8.0 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	HERB	Oust	75	%AW/W	SG	0.5	oz wt/a	A	0.2996 g/mx	103	209	308
	HERB	Accord	4	LB/GAL	SL	12.8	fl oz/a	A	8.0 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
10	CHK	Untreated Check								110	208	304

Chart 74. Annual ryegrass (*Lolium multiflorum*) control (percent) 1 MAT.

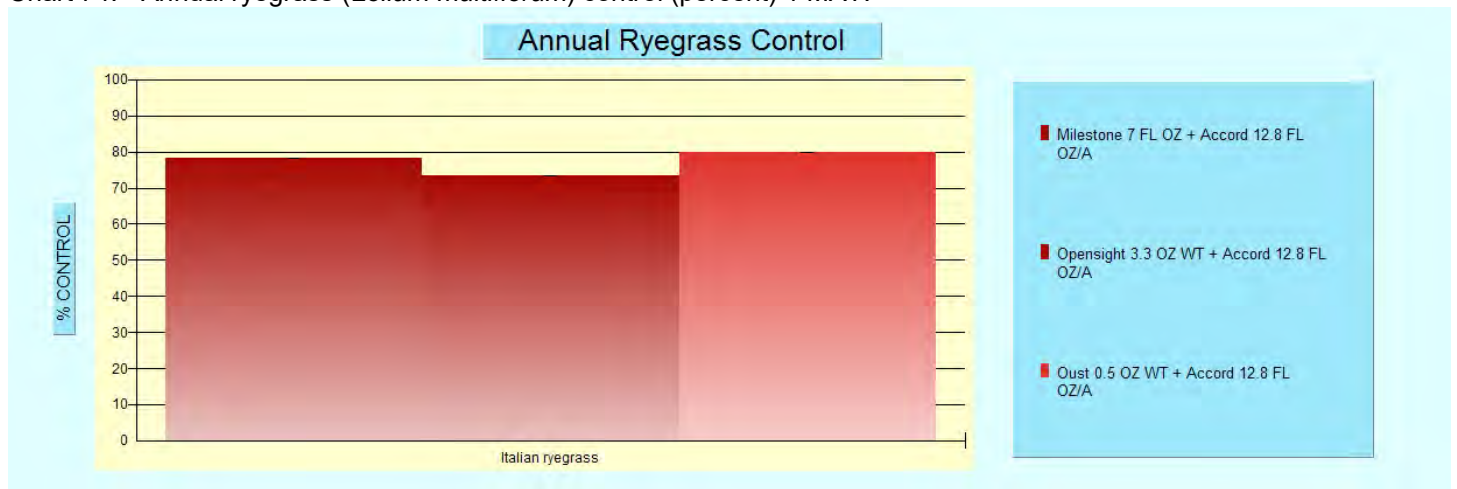
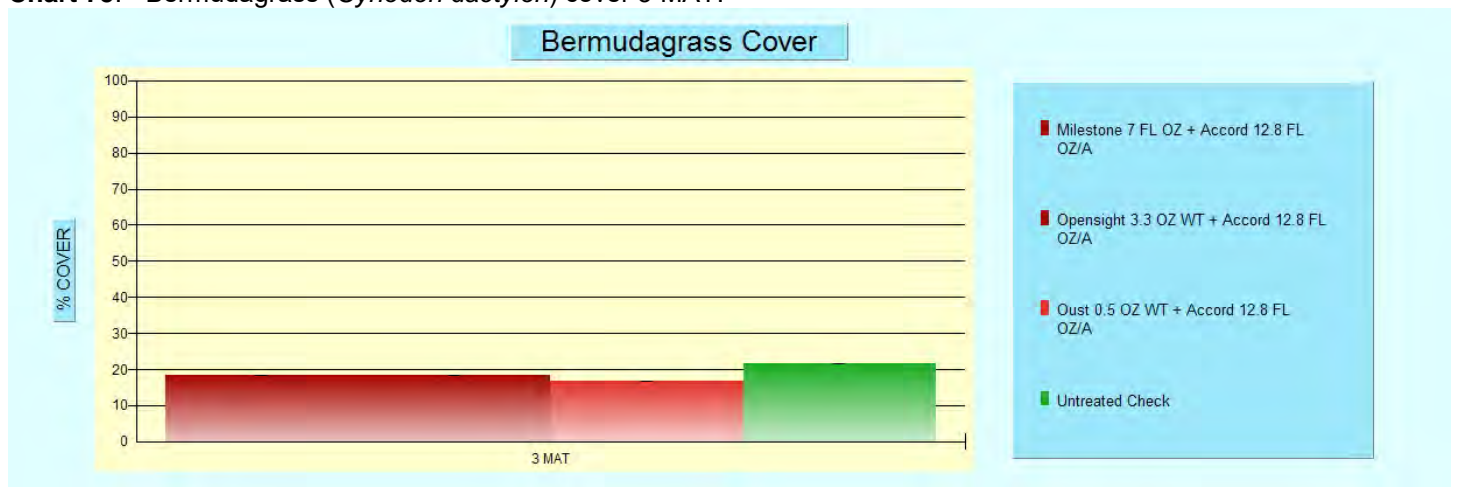


Chart 75. Bermudagrass (*Cynodon dactylon*) cover 3 MAT.



2015 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)

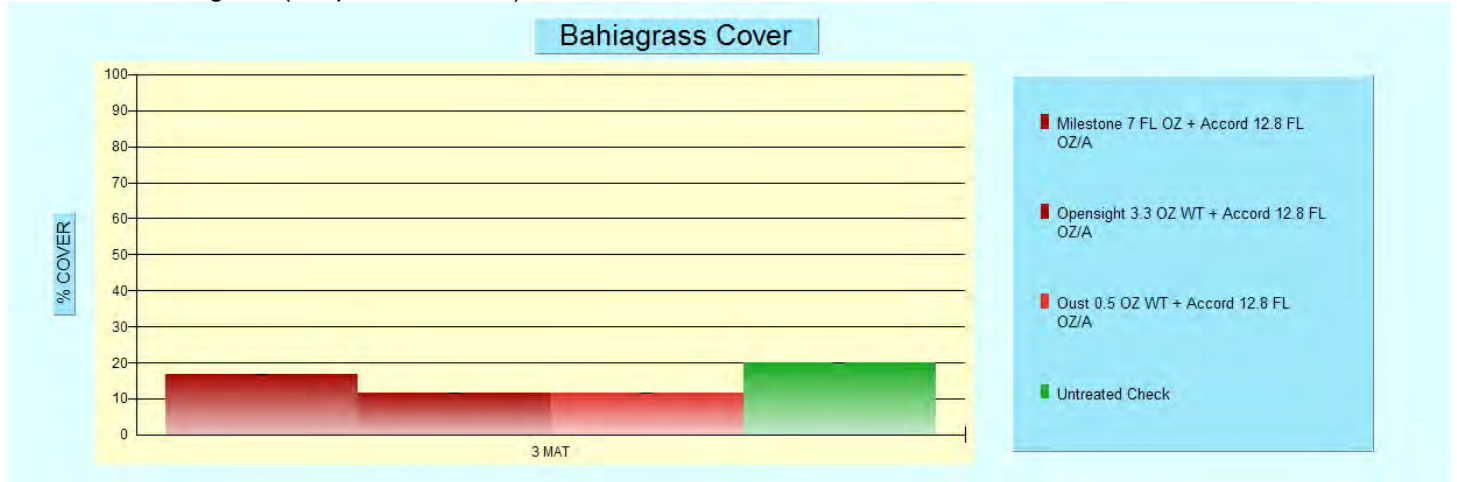
Protocol ID: Dow_standards
 Location: Meridian, MS

Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Italian rye>	Carnation c>	Common vetch	Downy brome	Blue-stem b>	Carolina ge>	Small hop c>		
Crop Name	3/24/15	3/24/15	3/24/15	3/24/15	3/24/15	3/24/15	3/24/15		
Rating Date	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Data Type	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Rating Unit									
Trt Treatment									
No. Name	Rate	Unit	1	2	3	4	5	6	7
1 Milestone	7 fl oz/a		43.3	33.3	5.0	5.0	2.0	1.7	30.0
Accord	12.8 fl oz/a								
NIS	0.25 % v/v								
2 Oversight	3.3 oz wt/a		43.3	36.7	4.0	5.0	1.7	2.7	26.7
Accord	12.8 fl oz/a								
NIS	0.25 % v/v								
3 Oust	0.5 oz wt/a		50.0	36.7	5.0	5.0	2.0	1.7	23.3
Accord	12.8 fl oz/a								
NIS	0.25 % v/v								
10 Untreated Check			43.3	33.3	5.0	5.0	2.7	1.7	30.0
LSD (P=Various)	11.54	8.81	1.73	0.00	2.18	1.73	13.73		
Standard Deviation	5.77	4.41	0.87	0.00	1.09	0.87	6.87		
CV	12.83	12.6	18.23	0.0	52.46	45.18	24.99		
Bartlett's X2	0.0	0.184	0.0	0.0	1.501	5.155	0.801		
P(Bartlett's X2)	1.00	0.98	.	.	0.682	0.161	0.849		
Mean Sep. Test									
Replicate F	9.000	39.857	1.000	0.000	0.907	4.111	4.765		
Replicate Prob(F)	0.0156	0.0003	0.4219	1.0000	0.4527	0.0751	0.0577		
Treatment F	1.000	0.571	1.000	0.000	0.442	1.000	0.647		
Treatment Prob(F)	0.4547	0.6542	0.4547	1.0000	0.7316	0.4547	0.6128		

Means followed by same letter do not differ significantly.

Chart 76. Bahiagrass (*Paspalum notatum*) cover 3 MAT.



2015 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)

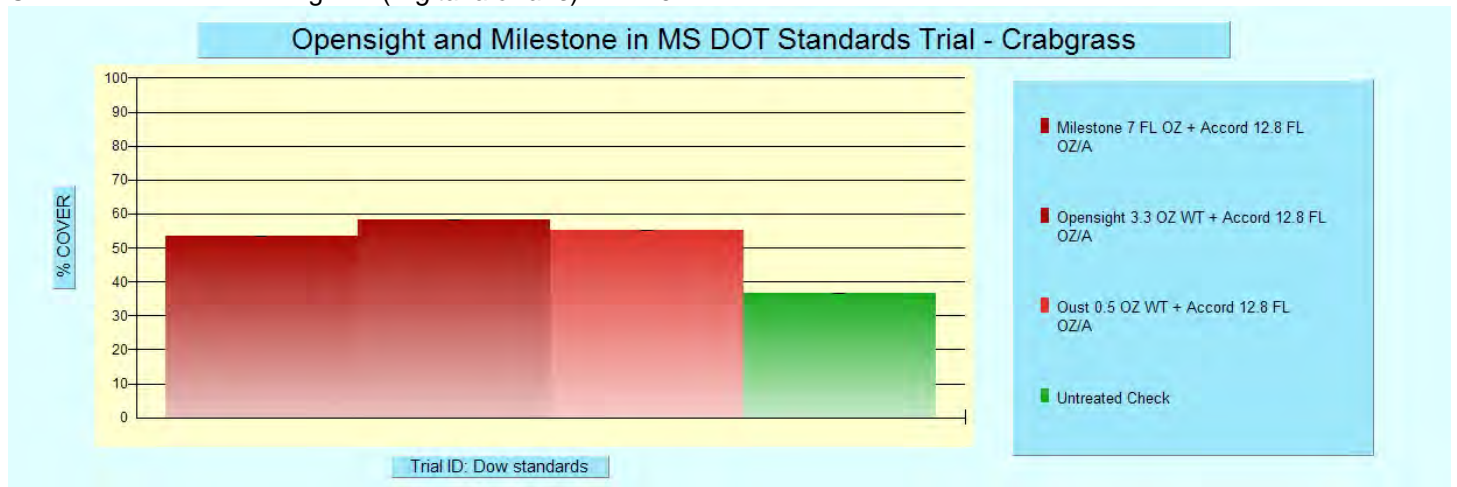
Protocol ID: Dow_standards
 Location: Meridian, MS

Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Buckhorn pl>	Italian rye>	Carnation c>	Small hop c>	Carolina ge>	Bermuda gra>	Bahiagrass			
Crop Name	3/24/15	4/23/15	4/23/15	4/23/15	4/23/15	6/5/15	6/5/15			
Rating Date	GROUND	CONTRO	CONTRO	CONTRO	CONTRO	GROUND	GROUND			
Rating Data Type	%AREA	%	%	%	%	%AREA	%AREA			
Rating Unit										
Trt No.	Treatment Name	Rate	Unit	8	9	10	11	12	13	14
1	Milestone Accord NIS	7 fl oz/a 12.8 fl oz/a 0.25 % v/v		3.3	78.3 a	100.0 a	100.0 a	100.0 a		
2	Opensight Accord NIS	3.3 oz wt/a 12.8 fl oz/a 0.25 % v/v		1.7	73.3 a	100.0 a	100.0 a	93.3 a		
3	Oust Accord NIS	0.5 oz wt/a 12.8 fl oz/a 0.25 % v/v		0.0	80.0 a	90.0 b	90.0 b	63.3 b		
10	Untreated Check			1.7	0.0	0.0	0.0	0.0	21.7	20.0
LSD (P=Various)				4.71	15.11	0.00	0.00	15.11	.	.
Standard Deviation				2.36	6.67	0.00	0.00	6.67	.	.
CV				141.42	8.63	0.0	0.0	7.79	.	.
Bartlett's X2				1.248	0.143	0.0	0.0	0.824	.	.
P(Bartlett's X2)				0.536	0.706	.	.	0.364	.	.
Mean Sep. Test					LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				6.000	0.063	0.000	0.000	1.750		
Replicate Prob(F)				0.0370	0.9403	1.0000	1.0000	0.2844		
Treatment F				1.000	0.813	0.000	0.000	25.750		
Treatment Prob(F)				0.4547	0.5057	1.0000	1.0000	0.0052		

Means followed by same letter do not differ significantly.

Chart 77. Southern crabgrass (*Digitaria ciliaris*) cover 3 MAT.



2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

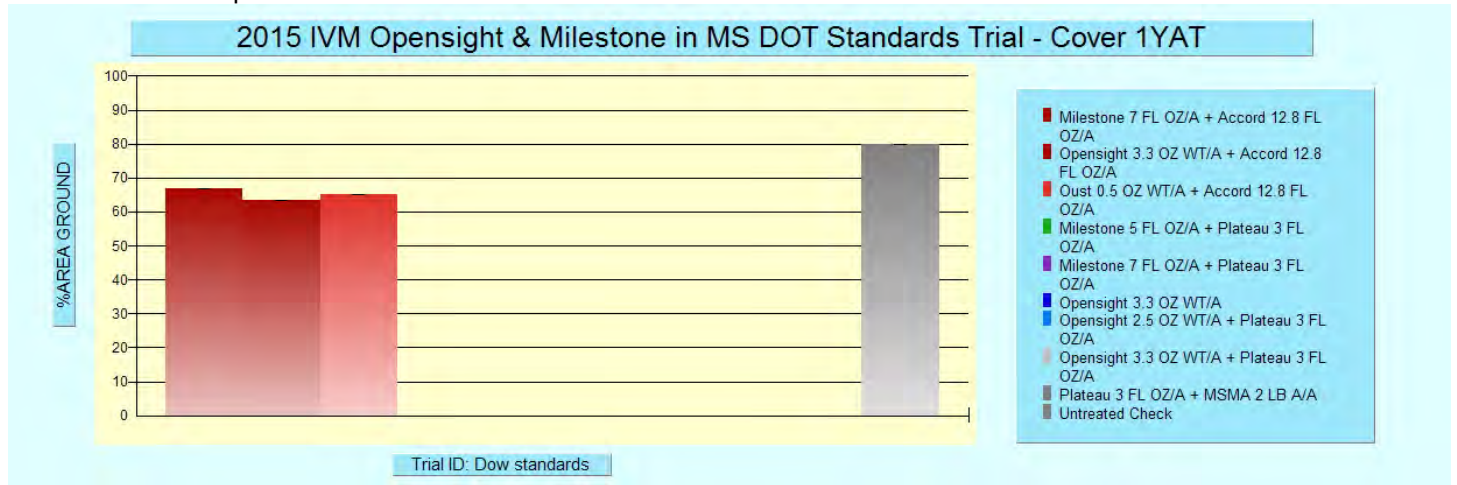
Protocol ID: Dow_standards
 Location: Meridian, MS

Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Digitaria c>	Blue-stem b>	Conyza cana>	Buckhorn pl>	Overall	Bermuda gra>	Bahiagrass	Digitaria c>
Crop Name	6/5/15	6/5/15	6/5/15	6/5/15	6/5/15	6/22/15	6/22/15	6/22/15
Rating Date	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Data Type	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA
Rating Unit								
Trt No.	15	16	17	18	19	20	21	22
Treatment Name								
Rate								
Unit								
1 Milestone						18.3 a	16.7 b	53.3 a
Accord								
NIS								
2 Opensight						18.3 a	11.7 c	58.3 a
Accord								
NIS								
3 Oust						16.7 a	11.7 c	55.0 a
Accord								
NIS								
10 Untreated Check	36.7	5.7	4.0	4.3	66.7	21.7 a	20.0 a	36.7 a
LSD (P=Various)	.	.	.	.	.	18.76	2.88	15.97
Standard Deviation	.	.	.	.	.	9.39	1.44	7.99
CV	.	.	.	.	.	50.09	9.62	15.72
Bartlett's X2	.	.	.	.	.	0.124	0.0	4.58
P(Bartlett's X2)	.	.	.	.	.	0.989	0.001*	0.205
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F						3.047	9.000	4.043
Replicate Prob(F)						0.1221	0.0156	0.0773
Treatment F						0.150	24.000	4.391
Treatment Prob(F)						0.9262	0.0010	0.0586

Means followed by same letter do not differ significantly.

Chart 78. Overall plot cover 1 YAT.



2015 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)

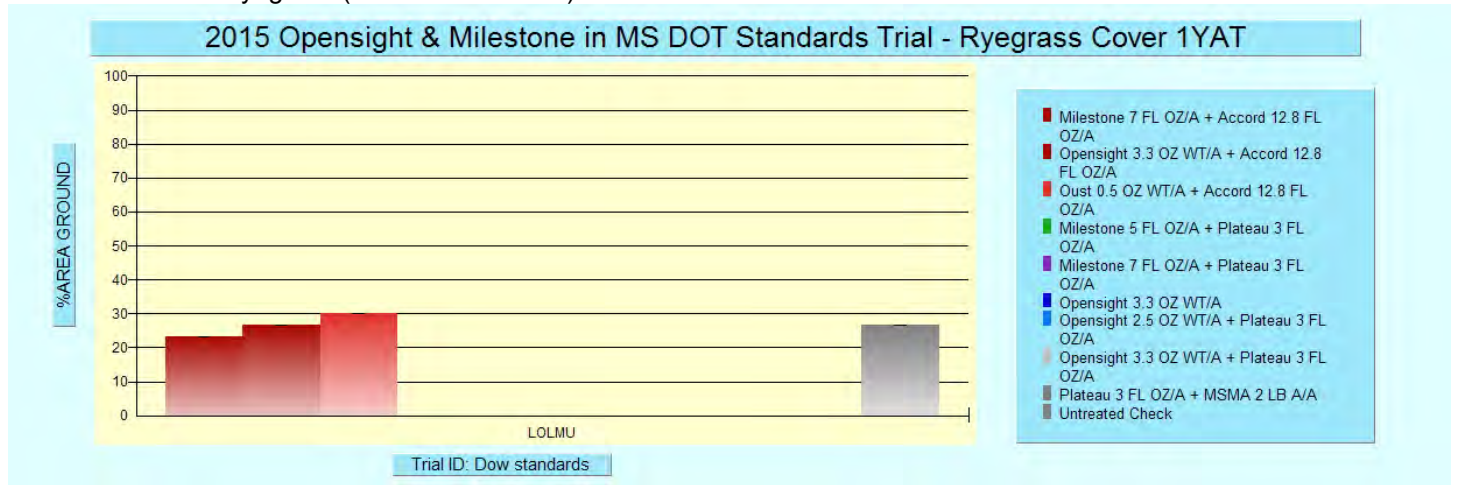
Protocol ID: Dow_standards
 Location: Meridian, MS

Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Blue-stem b>	Conyza cana>	Buckhorn pl>	Overall	Bermuda gra>	Bermuda gra>	Bahiagrass
Crop Name	6/22/15	6/22/15	6/22/15	6/22/15	7/6/15	7/6/15	7/6/15
Rating Date	GROUND	GROUND	GROUND	GROUND	CONTRO	COLOR	CONTRO
Rating Data Type	%AREA	%AREA	%AREA	%AREA	%	1-9	%
Rating Unit							
Trt Treatment	23	24	25	26	27	28	29
No. Name	Rate	Rate	Rate	Rate	Rate	Rate	Rate
1 Milestone	7 fl oz/a	0.0 b	1.7 a	63.3 a			
Accord	12.8 fl oz/a						
NIS	0.25 % v/v						
2 Oversight	3.3 oz wt/a	0.0 b	0.0 a	66.7 a			
Accord	12.8 fl oz/a						
NIS	0.25 % v/v						
3 Oust	0.5 oz wt/a	0.7 b	0.7 a	70.0 a			
Accord	12.8 fl oz/a						
NIS	0.25 % v/v						
10 Untreated Check		4.0 a	4.3 a	66.7 a	0.0	7.0	0.0
LSD (P=Various)	6.27	2.38	5.52	7.45	.	.	.
Standard Deviation	3.14	1.19	2.76	3.73	.	.	.
CV	87.63	102.02	165.83	5.59	.	.	.
Bartlett's X2	0.033	0.301	3.197	0.0	.	.	.
P(Bartlett's X2)	0.855	0.583	0.202	0.001*	.	.	.
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	0.820	0.059	1.713	4.200			
Replicate Prob(F)	0.4845	0.9434	0.2580	0.0723			
Treatment F	1.068	7.765	1.425	1.600			
Treatment Prob(F)	0.4303	0.0173	0.3249	0.2853			

Means followed by same letter do not differ significantly.

Chart 79. Annual ryegrass (*Lolium multiflorum*) cover 1 YAT.



2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name	Digitaria c>	Overall	Italian rye>	Carolina ge>	Carnation c>	Buckhorn pl>	Small hop c>	Conyza cana>			
Crop Name											
Rating Date	9/4/15	3/24/16	3/24/16	3/24/16	3/24/16	3/24/16	3/24/16	3/24/16			
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA			
Trt No.	Treatment Name	Rate	Unit	53	54	55	56	57	58	59	60
1	Milestone	7 fl oz/a			66.7 b	23.3 a	12.3 a	11.7 a	10.3 a	18.3 a	2.3 a
	Accord	12.8 fl oz/a									
	NIS	0.25 % v/v									
2	Opensight	3.3 oz wt/a			63.3 b	26.7 a	13.3 a	10.0 a	1.0 a	18.3 a	2.3 a
	Accord	12.8 fl oz/a									
	NIS	0.25 % v/v									
3	Oust	0.5 oz wt/a			65.0 b	30.0 a	12.3 a	11.7 a	0.3 a	30.0 a	2.3 a
	Accord	12.8 fl oz/a									
	NIS	0.25 % v/v									
10	Untreated Check			56.7	80.0 a	26.7 a	4.0 a	16.7 a	8.3 a	33.3 a	0.7 a
	LSD (P=Various)			.	6.86	9.42	14.23	17.54	15.83	15.53	2.88
	Standard Deviation			.	3.44	4.71	7.12	8.78	7.92	7.77	1.44
	CV			.	5.0	17.68	67.85	70.24	158.43	31.09	75.31
	Bartlett's X2			.	0.048	1.313	5.532	1.172	16.452	1.006	2.948
	P(Bartlett's X2)			.	0.976	0.726	0.137	0.76	0.001*	0.605	0.40
	Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F				4.765	10.500	10.478	0.568	2.179	1.966	4.840
	Replicate Prob(F)				0.0577	0.0110	0.0110	0.5946	0.1943	0.2205	0.0560
	Treatment F				14.765	1.000	1.123	0.324	1.232	3.034	1.000
	Treatment Prob(F)				0.0035	0.4547	0.4114	0.8082	0.3771	0.1147	0.4547

Means followed by same letter do not differ significantly.

2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name	Blue-stem b>	Bahiagrass	Overall	Buckhorn pl>	Conyza cana>	Blue-stem b>	Bermuda gra>		
Crop Name	3/24/16	6/7/16	6/7/16	6/7/16	6/7/16	6/7/16	6/7/16		
Rating Date	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Data Type	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Rating Unit									
Trt No.	Treatment Name	Rate Unit	61	62	63	64	65	66	67
1	Milestone	7 fl oz/a	5.7 a						
	Accord	12.8 fl oz/a							
	NIS	0.25 % v/v							
2	Opensight	3.3 oz wt/a	4.0 a						
	Accord	12.8 fl oz/a							
	NIS	0.25 % v/v							
3	Oust	0.5 oz wt/a	4.0 a						
	Accord	12.8 fl oz/a							
	NIS	0.25 % v/v							
10	Untreated Check		11.7 a	18.3	60.0	10.0	3.7	11.7	15.0
	LSD (P=Various)		8.73	.	.	.	.	.	.
	Standard Deviation		4.37	.	.	.	.	.	.
	CV		69.03	.	.	.	.	.	.
	Bartlett's X2		8.03	.	.	.	.	.	.
	P(Bartlett's X2)		0.045*	.	.	.	.	.	.
	Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F		0.436						
	Replicate Prob(F)		0.6656						
	Treatment F		2.081						
	Treatment Prob(F)		0.2042						

Means followed by same letter do not differ significantly.

2015 IVM - Opensight and Milestone in MS DOT Standards Trial

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Affiliation: MSU
Investigator: John Byrd

Title: _____

Title: _____

Trial Location

City: Meridian
State/Prov.: MS

Trial Status: ___Completed___
Trial Reliability: _____

Conducted Under GLP: _
Conducted Under GEP: X

Official Trial Code: _____
Other Trial Code: _____

Site and Design

Plot Width, Unit: 10 FT
Plot Length, Unit: 30 FT
Replications: 3
% Slope: _____

Site Type: _____
Tillage Type: _____
Study Design: Randomized Complete Block
Soil Drainage: _ _____

Application Description

	A	B
Application Date:	3/24/15	6/5/15
Time of Day:	12:05 PM	1:00 PM
Application Method:	SPRAY	SPRAY
Application Timing:	POSPOS	POSPOS
Application Placement:	FOLIAR	FOLIAR
Applied By:	VMaddox	VMaddox
Air Temperature, Unit:	67 F	84 F
% Relative Humidity:	70	60
Wind Velocity, Unit:	8 MPH	5 MPH
Wind Direction:	S	NE
Dew Presence (Y/N):	N	N
Soil Moisture:	ADEQUATE	ADEQUATE
% Cloud Cover:	60	20

Application Equipment

	A	B
Appl. Equipment:	CO2 Backpack	CO2 Backpack
Operating Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	Flat fan	Flat Fan
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	Water	Water
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 Liters	2 Liters
Tank Mix (Y/N):	Y	Y

2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Results and Conclusions:

This study is part of a two application study as noted on page 144, with a total of 10 treatments. This section covers the results of the second application in the study which includes treatments 4, 5, 6, 7, 8, 9, and 10. The untreated check is treatment 10 for both studies, which was rated on the same days and times as other treatments with which it was compared. Blank data columns in the following tables should be disregarded as they apply to application 1 data.

Cool-Season Weed Response.

At 0 DAT, buckhorn plantain (*Plantago lanceolata*) cover was low, ranging from 1.7 to 4.3 percent on average and differences among plots were not significant. Control was observed at 31 DAT and ranged from 80 (Milestone low rate plus Plateau) to 30 (Opensight low rate plus Plateau) percent, but differences were not significant. Although there was less cover in treated plots, it was not significant compared to the untreated at 3 MAT.

Buckhorn plantain cover was reduced in all treated plots (0 to 4 %) compared to the untreated plots (10 %) at 1 YAT. Buckhorn plantain cover was lowest in the Plateau plus MSMA plots at 0 percent.

Turfgrass Response.

At 0 DAT, bermudagrass (*Cynodon dactylon*) average cover was similar in all treatments and ranged from 20 to 30 percent. Bahiagrass (*Paspalum notatum*) was similar and ranged from 16.3 to 23.3. This is likely due to glyphosate in the treatments, although cover in treatments with Opensight or Oust was significantly lower compared to the treatment with Milestone. This may indicate bahiagrass had additional sensitivity to sulfonyl urea herbicides in this study.

At 31 DAT, some control and discoloration of bermudagrass turf was observed. However, control was minimal (3.3 to 11.7 percent) and discoloration was not significant compared to the untreated. In addition, differences in bermudagrass cover were not significant. Control and discoloration of bahiagrass was much more pronounced at 31 DAT. Control ranged from 40 to 73.3 percent, but not significantly different among treated plots. Differences in Bahiagrass cover were also not significant at 31 DAT. Although discoloration in treated plots was not significant compared untreated plots it would not be desirable, ranging from 3.7 to 4.7 across treated plots.

At 61 DAT, no control of bermudagrass was observed and bahiagrass control remained similar to 31 DAT ratings. In addition, there were no significant differences in cover across all treatments.

Although bermudagrass cover was not significant across treatments, the highest cover (41.7 %) was observed in the Plateau plus MSMA treatment at 91 DAT. This is likely a release from other warm-season grasses (bahiagrass, broomsedge, and crabgrass specifically) observed in the study. Bahiagrass control was still greatest (70 %) in the Plateau plus MSMA at 91 DAT.

At 1 YAT, bahiagrass cover was significantly less in all treated plots compared to the untreated (**Chart 80**). Bermudagrass cover was not significantly different across all treatments, but was higher in all treated plots (20 to 40 %) compared to the untreated plots (15 %) at 1 YAT (**Chart 81**).

2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Results and Conclusions (Continued):

Warm-Season Weed Response.

At 0 MAT, crabgrass (*Digitaria ciliaris*) cover had the highest plot cover ranging from 36.7 to 46.7 (**Chart 82**). Broomsedge (*Andropogon virginicus*) and horseweed (*Conyza canadensis*) cover were relatively low at 0 MAT.

AT 31 DAT, crabgrass control was significantly higher in Plateau plus MSMA plots (89.3 %) compared to other treatments. Since the 3 oz/A rate of Plateau was included in other treatments, this indicates that MSMA is likely responsible for the crabgrass response. A similar response was observed with broomsedge (91.7 %) control, but was more pronounced. The pattern was reversed for horseweed control, but the differences were not significant.

AT 61 DAT, crabgrass control was similar with Plateau plus MSMA plots (83.3 %) showing significantly more control compared to other treatments. Crabgrass cover was also significantly lower in the Plateau plus MSMA treated plots. Horseweed control ranged from 70 to 100 percent at 61 DAT, but differences were not significant. This horseweed control pattern remained through 91 DAT. Broomsedge cover was reduced (0.7 %) in Plateau plus MSMA plots but broomsedge cover was not significant compared to other treatments.

At 91 DAT, crabgrass was taller (56 cm) than bermudagrass (43 cm) on average (data not shown) and illustrates its ability to compete vertically with bermudagrass turf. It may also help explain why bermudagrass cover (41.7 %) was highest at 91 DAT in the Plateau plus MSMA treatments while the same plots had the highest crabgrass control (85 %). Crabgrass control was significantly higher and crabgrass cover significantly less in this treatment compared to all other treated plots.

At 1 YAT, horseweed cover was not significantly different across treatments. Broomsedge cover was less in the Plateau plus MSMA plots, but differences were not significant. Crabgrass cover was not adequately developed and not rated at 1 YAT.

Overall Cover.

Overall cover at 0 MAT ranged from 63.3 to 66.7. At 31 DAT, cover was reduced in treated plots (51.7 to 61.7 %) compared to the check (70 %), but differences were not significant. Overall cover was significantly less in treated plots compared to the untreated (76.7 %). It is not clear if this was a result of bahiagrass damage or loss in weed cover, but it is likely both contributed to the differences. This trend was similar at 91 DAT.

Overall cover at 1 YAT was highest in the untreated plots, but not significantly higher than the higher rate of Milestone plus Plateau (**Chart 83**). Some of the differences in cover may be attributed to an increase in weed cover in untreated plots. However, bahiagrass damage in treated plots also contributed (**Chart 80**) to this pattern.

Overall Conclusions.

Treatments in general favored bermudagrass turf development by reducing warm-season grass competition, particularly the Plateau plus MSMA treatment. However, bahiagrass turf was damaged during the study and did not recover by 1 YAT. This is a caution when using these treatments where bahiagrass is desired, or bermudagrass is desired but not present.

2015 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
 Location: Meridian, MS

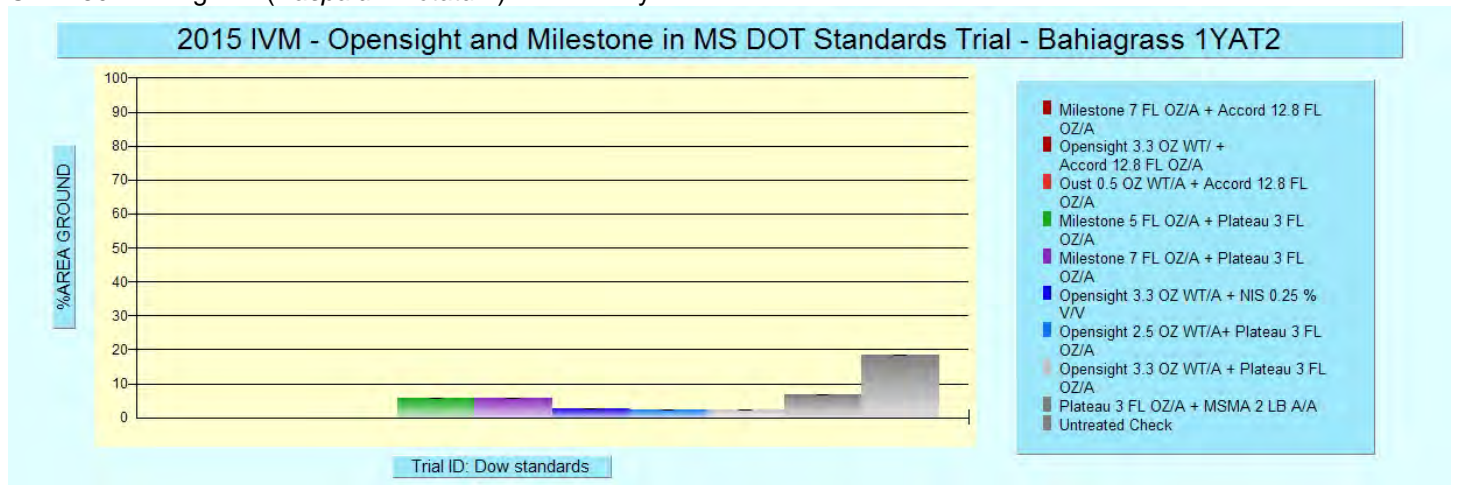
Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

Reps: 3
 Spray vol: 25 gal/ac

Plots: 10 by 30 feet
 Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
4	HERB	Milestone	2	LB/GAL	SL	5	fl oz/a	B	3.125 ml/mx	104	203	301
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
5	HERB	Milestone	2	LB/GAL	SL	7	fl oz/a	B	4.375 ml/mx	105	210	309
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
6	HERB	Oversight	61.95	%AEW/W	WG	3.3	oz wt/a	B	1.977 g/mx	106	205	302
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
7	HERB	Oversight	61.95	%AEW/W	WG	2.5	oz wt/a	B	1.498 g/mx	107	202	306
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
8	HERB	Oversight	61.95	%AEW/W	WG	3.3	oz wt/a	B	1.977 g/mx	108	201	310
	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
9	HERB	Plateau	2	LB/GAL	SL	3	fl oz/a	B	1.875 ml/mx	109	206	307
	HERB	MSMA	6	LBA/GAL	SC	2	lb ai/a	B	26.66 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	B	4.999 ml/mx			
10	CHK	Untreated Check								110	208	304

Chart 80. Bahiagrass (*Paspalum notatum*) cover at 1 year after treatment.



2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

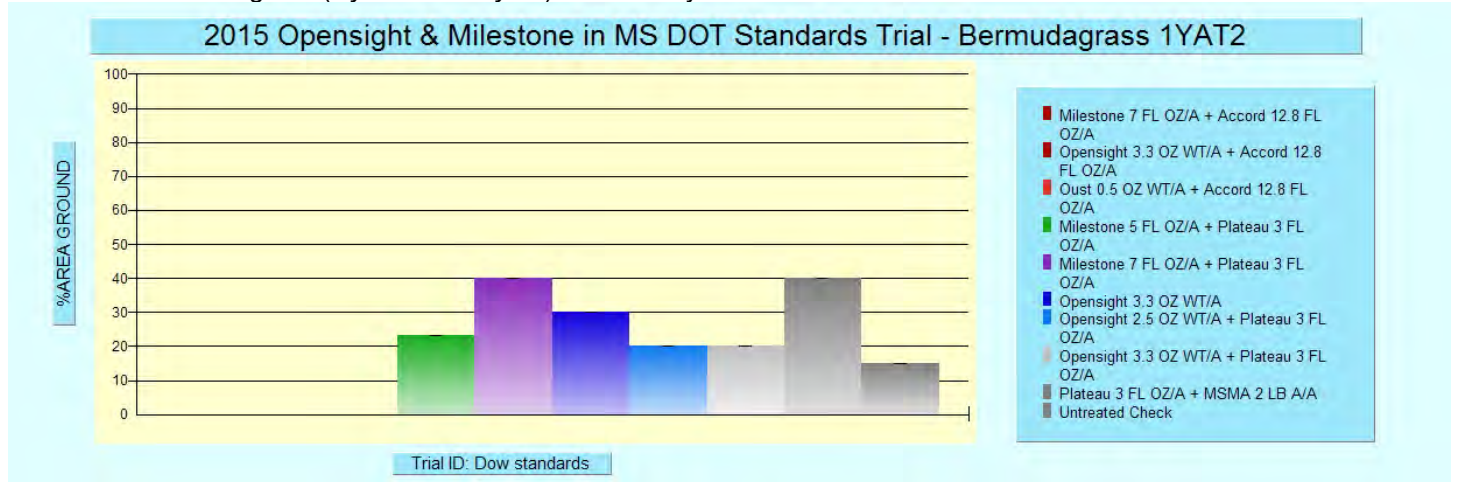
Protocol ID: Dow_standards
 Location: Meridian, MS

Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Buckhorn pl>	Italian rye>	Carnation c>	Small hop c>	Carolina ge>	CYNDA BGRM	PASNO BGRM			
Crop Code						Bermuda gra>	Bahiagrass			
BBCH Scale						6/5/15	6/5/15			
Crop Name						GROUND	GROUND			
Rating Date	3/24/15	4/23/15	4/23/15	4/23/15	4/23/15	GROUND	GROUND			
Rating Data Type	GROUND	CONTRO	CONTRO	CONTRO	CONTRO	%AREA	%AREA			
Rating Unit	%AREA	%	%	%	%	%AREA	%AREA			
Trt No.	Treatment Name	Rate	Unit	8	9	10	11	12	13	14
4	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v							21.7 a	20.0 a
5	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v							30.0 a	23.3 a
6	Opensight NIS NIS	3.3 oz wt/a 0.25 % v/v 0.25 % v/v							28.3 a	16.7 a
7	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v							20.0 a	18.3 a
8	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v							21.7 a	16.7 a
9	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v							26.7 a	18.3 a
10	Untreated Check			1.7	0.0	0.0	0.0	0.0	21.7 a	20.0 a
LSD (P=Various)				.	.	.	.	.	11.70	7.56
Standard Deviation				.	.	.	.	.	6.58	4.25
CV				.	.	.	.	.	27.08	22.31
Bartlett's X2				.	.	.	.	.	3.323	1.776
P(Bartlett's X2)				.	.	.	.	.	0.767	0.777
Mean Sep. Test					LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F									9.991	0.462
Replicate Prob(F)									0.0028	0.6410
Treatment F									1.083	0.901
Treatment Prob(F)									0.4250	0.5249

Means followed by same letter do not differ significantly.

Chart 81. Bermudagrass (*Cynodon dactylon*) cover at 1 year after treatment.



2015 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)

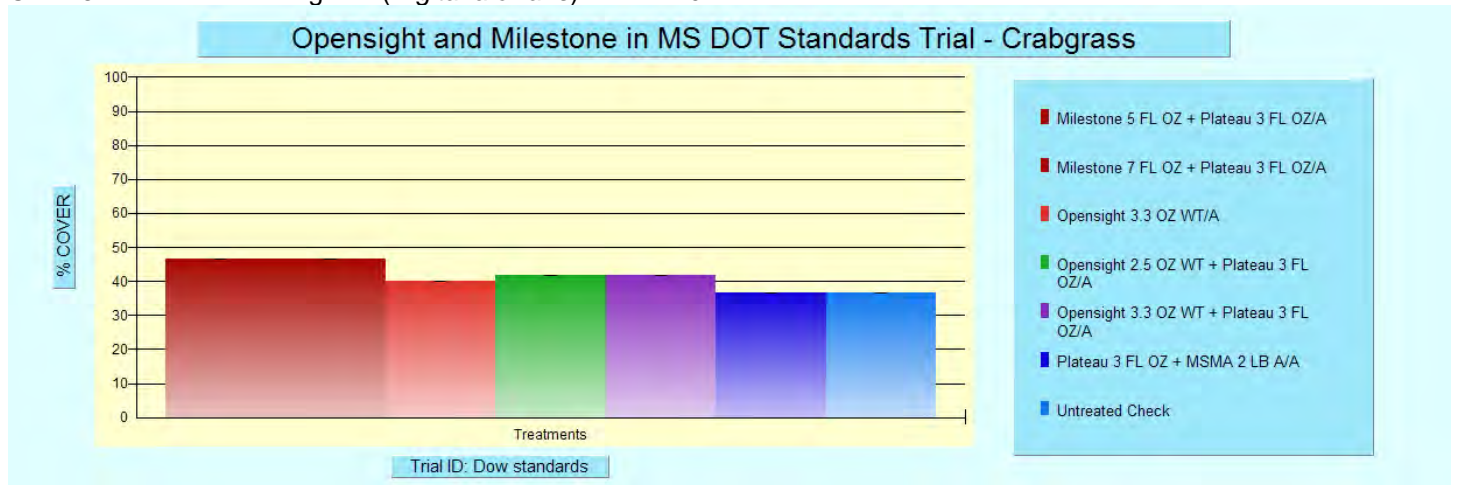
Protocol ID: Dow_standards
 Location: Meridian, MS

Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Digitaria c>	Blue-stem b>	Conyza cana>	Buckhorn pl>	Overall	CYNDA BGRM Bermuda gra>	PASNO BGRM Bahigrass	Digitaria c>
Crop Code								
BBCH Scale								
Crop Name								
Rating Date	6/5/15	6/5/15	6/5/15	6/5/15	6/5/15	6/22/15	6/22/15	6/22/15
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA
Trt No.	15	16	17	18	19	20	21	22
Treatment Name								
Rate								
Unit								
4 Milestone	46.7 a	5.7 a	3.0 a	4.0 a	63.3 a			
Plateau								
NIS								
5 Milestone	46.7 a	4.0 a	3.0 a	3.3 a	66.7 a			
Plateau								
NIS								
6 Oversight	40.0 a	4.7 a	3.0 a	3.3 a	63.3 a			
NIS								
NIS								
7 Oversight	41.7 a	4.7 a	4.0 a	3.0 a	63.3 a			
Plateau								
NIS								
8 Oversight	41.7 a	8.3 a	5.0 a	1.7 a	66.7 a			
Plateau								
NIS								
9 Plateau	36.7 a	4.0 a	4.0 a	2.3 a	66.7 a			
MSMA								
NIS								
10 Untreated Check	36.7 a	5.7 a	4.0 a	4.3 a	66.7 a	21.7	20.0	36.7
LSD (P=Various)	10.45	5.32	2.97	4.63	8.68	.	.	.
Standard Deviation	5.88	2.99	1.67	2.60	4.88	.	.	.
CV	14.18	56.58	44.94	82.84	7.48	.	.	.
Bartlett's X2	3.043	3.141	0.0	5.348	0.0	.	.	.
P(Bartlett's X2)	0.803	0.791	0.001*	0.50	0.001*	.	.	.
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	12.828	4.025	0.462	9.885	3.800			
Replicate Prob(F)	0.0010	0.0460	0.6410	0.0029	0.0527			
Treatment F	1.483	0.763	0.615	0.375	0.400			
Treatment Prob(F)	0.2640	0.6125	0.7148	0.8813	0.8652			

Means followed by same letter do not differ significantly.

Chart 82. Southern crabgrass (*Digitaria ciliaris*) cover at 0 DAT.



2015 IVM - Oversight and Milestone in MS DOT Standards Trial (Continued)

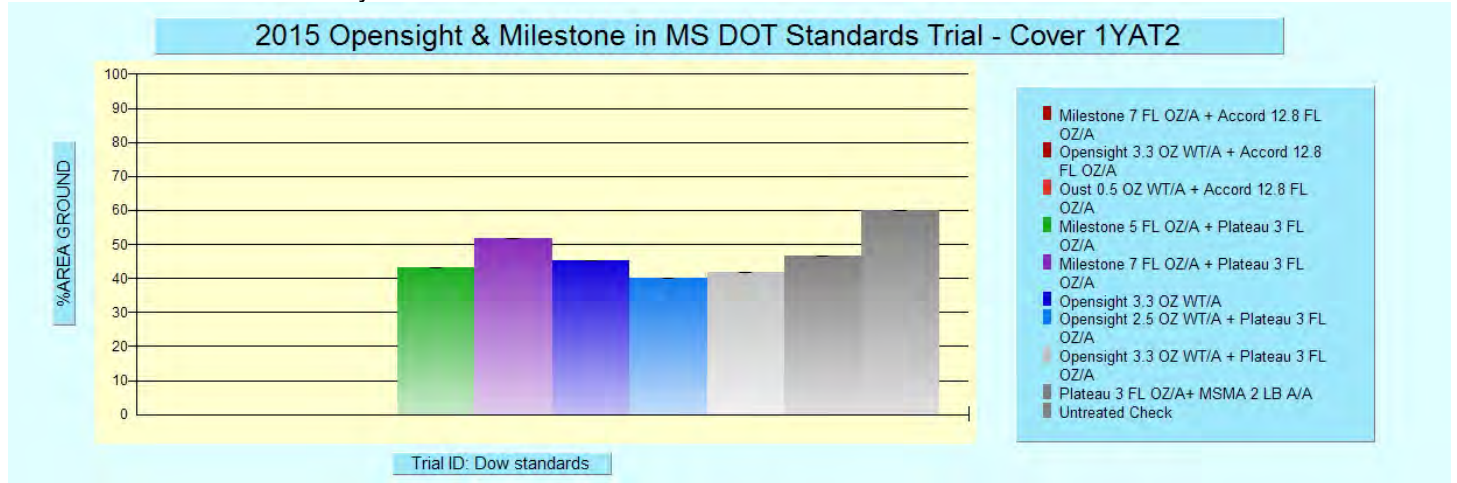
Protocol ID: Dow_standards
 Location: Meridian, MS

Trial ID: Dow_standards
 Study Director: Victor Maddox
 Investigator: John Byrd

Trt	Treatment	Rate	Unit	Blue-stem b>	Conyza cana>	Buckhorn pl>	Overall	CYNDA BGRM Bermuda gra> 7/6/15	CYNDA BGRM Bermuda gra> 7/6/15	PASNO BGRM Bahigrass 7/6/15
Rating Date	Rating Data Type	Rating Unit		6/22/15 GROUND %AREA	6/22/15 GROUND %AREA	6/22/15 GROUND %AREA	6/22/15 GROUND %AREA	7/6/15 CONTRO %	7/6/15 COLOR 1-9	7/6/15 CONTRO %
No.	Name	Rate	Unit	23	24	25	26	27	28	29
4	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v						11.7 a	6.3 a	53.3 a
5	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v						6.7 a	6.7 a	40.0 a
6	Oversight NIS NIS	3.3 oz wt/a 0.25 % v/v 0.25 % v/v						5.0 a	6.3 a	53.3 a
7	Oversight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v						5.0 a	7.0 a	56.7 a
8	Oversight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v						6.7 a	6.3 a	50.0 a
9	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v						3.3 a	6.7 a	73.3 a
10	Untreated Check			5.7	4.0	4.3	66.7	0.0	7.0 a	0.0
LSD (P=Various)				.	.	.	.	6.57	0.74	20.65
Standard Deviation				.	.	.	.	3.61	0.42	11.35
CV				.	.	.	.	56.56	6.31	20.85
Bartlett's X2				.	.	.	.	3.114	0.0	7.382
P(Bartlett's X2)				.	.	.	.	0.374	1.00	0.117
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F								1.383	3.545	2.241
Replicate Prob(F)								0.2949	0.0617	0.1569
Treatment F								1.894	1.545	2.759
Treatment Prob(F)								0.1825	0.2451	0.0808

Means followed by same letter do not differ significantly.

Chart 83. Overall cover at 1 year after treatment.



2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		Digitaria c>	Blue-stem b>	Conyza cana>	Buckhorn pl>	Overall	CYNDA BGRM Bermuda gra>	PASNO BGRM Bahigrass			
Crop Code		7/6/15	7/6/15	7/6/15	7/6/15	7/6/15	7/6/15	7/6/15			
BBCH Scale		7/6/15	7/6/15	7/6/15	7/6/15	7/6/15	7/6/15	7/6/15			
Crop Name		COLOR	CONTRO	CONTRO	CONTRO	CONTRO	GROUND	GROUND			
Rating Date		1-9	%	%	%	%	%AREA	%AREA			
Rating Data Type											
Rating Unit											
Trt No.	Treatment Name	Rate	Unit	30	31	32	33	34	35	36	37
4	Milestone Plateau	5 fl oz/a		4.3 a	33.3 b	0.0 b	93.3 a	80.0 a	58.5 a	21.7 a	15.0 a
	NIS	0.25 % v/v									
5	Milestone Plateau	7 fl oz/a		4.7 a	33.3 b	1.7 b	91.7 a	76.0 a	61.7 a	31.7 a	18.3 a
	NIS	0.25 % v/v									
6	Opensight NIS	3.3 oz wt/a		4.0 a	46.7 b	0.0 b	73.3 a	86.1 a	58.5 a	28.3 a	13.3 a
	NIS	0.25 % v/v									
7	Opensight Plateau	2.5 oz wt/a		4.0 a	43.3 b	0.0 b	86.7 a	30.0 a	51.7 a	21.7 a	15.0 a
	NIS	0.25 % v/v									
8	Opensight Plateau	3.3 oz wt/a		4.0 a	33.3 b	1.7 b	93.3 a	61.2 a	53.3 a	21.7 a	11.7 a
	NIS	0.25 % v/v									
9	Plateau MSMA	3 fl oz/a		3.7 a	89.3 a	91.7 a	46.7 a	57.2 a	53.5 a	30.0 a	8.3 a
	NIS	0.25 % v/v									
10	Untreated Check			6.0 a	0.0	0.0	0.0	0.0	70.0 a	25.0 a	16.7 a
	LSD (P=Various)	1.47		25.13	3.71	56.65	95.92	11.23	10.95	7.56	
	Standard Deviation	0.83		13.82	2.04	30.09	48.01	6.08	6.16	4.25	
	CV	18.86		29.68	12.89	37.22	73.76	10.45	23.94	30.25	
	Bartlett's X2	3.128		1.831	0.0	8.006	0.692	4.684	4.728	2.129	
	P(Bartlett's X2)	0.372		0.872	1.00	0.091	0.983	0.585	0.579	0.831	
	Mean Sep. Test	LSD.05		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	
	Replicate F	1.326		5.729	1.000	1.496	0.535	0.996	6.314	0.462	
	Replicate Prob(F)	0.3019		0.0220	0.4019	0.2806	0.6114	0.4065	0.0134	0.6410	
	Treatment F	2.674		7.433	994.200	1.119	0.545	3.239	1.455	1.824	
	Treatment Prob(F)	0.0694		0.0038	0.0001	0.4218	0.7389	0.0557	0.2727	0.1768	

Means followed by same letter do not differ significantly.

2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name					Digitaria c>	Digitaria c>	Conyza cana>
Crop Code	CYND	CYND	PASNO	PASNO			
BBCH Scale	BGRM	BGRM	BGRM	BGRM			
Crop Name	Bermuda gra>	Bermuda gra>	Bahiagrass	Bahiagrass			
Rating Date	8/5/15	8/5/15	8/5/15	8/5/15	8/5/15	8/5/15	8/5/15
Rating Data Type	GROUND	CONTRO	GROUND	CONTRO	CONTRO	GROUND	CONTRO
Rating Unit	%AREA	%	%AREA	%	%	%AREA	%
Trt No.	38	39	40	41	42	43	44
4 Milestone	23.3 a	0.0 a	16.7 a	53.3 a	33.3 b	36.7 ab	100.0 a
Plateau							
NIS							
5 Milestone	36.7 a	0.0 a	20.0 a	40.0 a	33.3 b	43.3 a	100.0 a
Plateau							
NIS							
6 Opensight	36.7 a	0.0 a	15.0 a	53.3 a	46.7 b	30.0 b	100.0 a
NIS							
NIS							
7 Opensight	20.0 a	0.0 a	15.0 a	56.7 a	43.3 b	36.7 ab	100.0 a
Plateau							
NIS							
8 Opensight	20.0 a	0.0 a	11.7 a	50.0 a	33.3 b	36.7 ab	100.0 a
Plateau							
NIS							
9 Plateau	36.7 a	0.0 a	13.3 a	73.3 a	89.3 a	15.0 c	70.0 a
MSMA							
NIS							
10 Untreated Check	23.3 a	0.0	23.3 a	0.0	0.0	43.3 a	0.0
LSD (P=Various)	14.93	0.00	8.82	20.65	25.13	12.38	41.30
Standard Deviation	8.39	0.00	4.96	11.35	13.82	6.96	22.36
CV	29.87	0.0	30.19	20.85	29.68	20.15	23.54
Bartlett's X2	5.068	0.0	3.066	7.382	1.831	4.928	0.0
P(Bartlett's X2)	0.535	.	0.801	0.117	0.872	0.553	.
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	2.755	0.000	4.500	2.241	5.729	13.451	0.900
Replicate Prob(F)	0.1036	1.0000	0.0348	0.1569	0.0220	0.0009	0.4402
Treatment F	2.817	0.000	1.968	2.759	7.433	5.893	0.900
Treatment Prob(F)	0.0599	1.0000	0.1499	0.0808	0.0038	0.0045	0.5206

Means followed by same letter do not differ significantly.

2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		Blue-stem b>	Overall	CYNDA BGRM	Overall	PASNO BGRM	PASNO BGRM	Conyza cana>	Digitaria c>		
Crop Code				Bermuda gra>		Bahiagrass	Bahiagrass				
BBCH Scale											
Crop Name											
Rating Date		8/5/15	8/5/15	9/4/15	9/4/15	9/4/15	9/4/15	9/4/15	9/4/15		
Rating Data Type		GROUND	GROUND	GROUND	GROUND	GROUND	CONTRO	CONTRO	CONTRO		
Rating Unit		%AREA	%AREA	%AREA	%AREA	%AREA	%	%	%		
Trt	Treatment	Rate	Rate								
No.	Name	Rate	Unit								
4	Milestone	5 fl oz/a		8.3 a	65.0 b	23.3 a	71.7 bc	20.0 a	46.7 a	100.0 a	16.7 b
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
5	Milestone	7 fl oz/a		5.7 a	66.7 b	36.7 a	73.3 b	21.7 a	40.0 a	100.0 a	13.3 b
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
6	Opensight	3.3 oz wt/a		5.7 a	61.7 bc	38.3 a	66.7 bcd	15.0 a	53.3 a	100.0 a	16.7 b
	NIS	0.25 % v/v									
	NIS	0.25 % v/v									
7	Opensight	2.5 oz wt/a		7.3 a	61.7 bc	20.0 a	60.0 de	15.0 a	56.7 a	100.0 a	16.7 b
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
8	Opensight	3.3 oz wt/a		11.7 a	56.7 c	20.0 a	58.3 e	11.7 a	50.0 a	100.0 a	20.0 b
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
9	Plateau	3 fl oz/a		0.7 a	60.0 bc	41.7 a	65.0 cde	15.0 a	70.0 a	70.0 a	85.0 a
	MSMA	2 lb ai/a									
	NIS	0.25 % v/v									
10	Untreated Check			5.7 a	76.7 a	25.0 a	85.0 a	28.3 a	0.0	0.0	0.0
	LSD (P=Various)			7.44	7.31	17.16	8.27	11.78	20.92	41.30	8.73
	Standard Deviation			4.18	4.11	9.65	4.65	6.62	11.50	22.36	4.80
	CV			65.04	6.41	32.94	6.78	36.59	21.79	23.54	17.11
	Bartlett's X2			7.503	2.94	4.746	3.059	2.051	6.052	0.0	1.184
	P(Bartlett's X2)			0.277	0.816	0.577	0.691	0.915	0.195	.	0.946
	Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F			2.484	6.847	2.418	0.165	1.412	2.563	0.900	8.373
	Replicate Prob(F)			0.1251	0.0104	0.1311	0.8497	0.2814	0.1263	0.4402	0.0073
	Treatment F			1.911	7.388	2.772	11.486	2.181	2.361	0.900	101.843
	Treatment Prob(F)			0.1600	0.0018	0.0627	0.0002	0.1179	0.1160	0.5206	0.0001

Means followed by same letter do not differ significantly.

2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name	Digitaria c>	Overall	Italian rye>	Carolina ge>	Carnation c>	Buckhorn pl>	Small hop c>	Conyza cana>			
Crop Code											
BBCH Scale											
Crop Name											
Rating Date	9/4/15	3/24/16	3/24/16	3/24/16	3/24/16	3/24/16	3/24/16	3/24/16			
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA			
Trt No.	Treatment Name	Rate	Unit	53	54	55	56	57	58	59	60
4	Milestone	5 fl oz/a		58.3 a							
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
5	Milestone	7 fl oz/a		55.0 a							
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
6	Opensight	3.3 oz wt/a		56.7 a							
	NIS	0.25 % v/v									
	NIS	0.25 % v/v									
7	Opensight	2.5 oz wt/a		58.3 a							
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
8	Opensight	3.3 oz wt/a		50.0 a							
	Plateau	3 fl oz/a									
	NIS	0.25 % v/v									
9	Plateau	3 fl oz/a		15.0 b							
	MSMA	2 lb ai/a									
	NIS	0.25 % v/v									
10	Untreated Check			56.7 a	80.0	26.7	4.0	16.7	8.3	33.3	0.7
	LSD (P=Various)			8.72	.	.	.	.	.	.	.
	Standard Deviation			4.90	.	.	.	.	.	.	.
	CV			9.8	.	.	.	.	.	.	.
	Bartlett's X2			6.745	.	.	.	.	.	.	.
	P(Bartlett's X2)			0.345	.	.	.	.	.	.	.
	Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F			3.719							
	Replicate Prob(F)			0.0554							
	Treatment F			30.777							
	Treatment Prob(F)			0.0001							

Means followed by same letter do not differ significantly.

2015 IVM - Opensight and Milestone in MS DOT Standards Trial (Continued)

Protocol ID: Dow_standards
Location: Meridian, MS

Trial ID: Dow_standards
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name	Blue-stem b>	PASNO BGRM Bahigrass	Overall	Buckhorn pl>	Conyza cana>	Blue-stem b>	CYNDA BGRM Bermuda gra>			
Crop Code										
BBCH Scale										
Crop Name										
Rating Date	3/24/16	6/7/16	6/7/16	6/7/16	6/7/16	6/7/16	6/7/16			
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA			
Trt No.	Treatment Name	Rate	Unit	61	62	63	64	65	66	67
4	Milestone Plateau NIS	5 fl oz/a 3 fl oz/a 0.25 % v/v			5.7 b	43.3 bc	3.3 a	5.3 a	10.7 a	23.3 a
5	Milestone Plateau NIS	7 fl oz/a 3 fl oz/a 0.25 % v/v			5.7 b	51.7 ab	3.3 a	4.3 a	8.3 a	40.0 a
6	Opensight NIS NIS	3.3 oz wt/a 0.25 % v/v 0.25 % v/v			2.7 b	45.0 bc	4.0 a	3.7 a	6.7 a	30.0 a
7	Opensight Plateau NIS	2.5 oz wt/a 3 fl oz/a 0.25 % v/v			2.3 b	40.0 c	3.3 a	8.3 a	10.0 a	20.0 a
8	Opensight Plateau NIS	3.3 oz wt/a 3 fl oz/a 0.25 % v/v			2.3 b	41.7 bc	3.3 a	6.7 a	15.7 a	20.0 a
9	Plateau MSMA NIS	3 fl oz/a 2 lb ai/a 0.25 % v/v			6.7 b	46.7 bc	0.0 a	5.0 a	0.7 a	40.0 a
10	Untreated Check			11.7	18.3 a	60.0 a	10.0 a	3.7 a	11.7 a	15.0 a
	LSD (P=Various)			.	4.90	10.45	5.80	6.03	10.26	23.70
	Standard Deviation			.	2.75	5.88	3.26	3.39	5.77	13.32
	CV			.	44.11	12.53	83.45	64.16	63.43	49.5
	Bartlett's X2			.	1.523	0.66	4.662	2.39	7.793	3.901
	P(Bartlett's X2)			.	0.958	0.985	0.459	0.881	0.254	0.69
	Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
	Replicate F				2.497	13.069	1.565	2.435	2.234	8.987
	Replicate Prob(F)				0.1240	0.0010	0.2489	0.1296	0.1497	0.0041
	Treatment F				12.572	4.138	2.529	0.758	1.962	1.698
	Treatment Prob(F)				0.0001	0.0175	0.0808	0.6160	0.1509	0.2048

Means followed by same letter do not differ significantly.

Esplanade plus Method bareground compared with Alternatives - Crabgrass

Protocol ID: HE15USADSG
Location: Brooksville, MS

Trial ID: HE15USADSG
Study Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Title: _____
Title: _____

Trial Location

City: Brooksville
State/Prov.: MS

Trial Status: _____
Trial Reliability: _____

Conducted Under GLP: _
Conducted Under GEP: X

Official Trial Code: _____
Other Trial Code: _____

Results and Conclusions:

This study evaluates the effects of bareground (pre-emergent) treatments on crabgrass (*Digitaria* spp.). The study was applied to the gravel clear zone between the pavement and slope. Short vegetation is preferred in this area to prevent vehicle fires, or fire in general, and for other safety reasons.

At 0 DAT (12 May 2015), smooth crabgrass (*Digitaria ischaemum*) was the dominate weed across the study. Japanese lespedeza (*Kummerowia striata*) and tufted lovegrass (*Eragrostis pectinacea*) were also present.

Weed Responses:

Smooth crabgrass control was significantly higher in all treated plots compared to Razor Pro alone at 1 MAT. This pattern remained through 3 MAT. Although crabgrass control was still much less (58.3%) in the Razor Pro (alone) plots at 4 MAT (119 DAT), it was not significantly better than other treated plots which ranged from 94.3 to 99.0% control. At 1 YAT (366 DAT), crabgrass cover was significantly higher in the Razor Pro (alone) and untreated plots (3 and 3.7%, respectively) compared to all other treated plots (0 to 0.7%).

Control of Japanese lespedeza was high (99.7 to 100%) in all treated plots and differences were not significant among treated plots at 1 MAT. At 2 MAT (59 DAT), the means separation was the same, but Japanese lespedeza control was down to 67% compared to 100% in all other treated plots. This pattern remained through 3 MAT. By 4 MAT, difference in control was not significant, although control in the Razor Pro (alone) plots was only 58.3% compared to 100% in all other treated plots on average.

Prostrate (ground) spurge (*Chamaesyce prostrata*) was apparently released in Razor Pro plots at 2 MAT, with cover significantly higher (6.7%) compared to all other treatments including the untreated plots (0 to 1.3%). A similar pattern was observe at 3 MAT, but cover was at 7.3 percent on the Razor Pro plots. This compared to the untreated plots (1.7%) which was not significantly lower than many of the treated plots. By 4 MAT, spurge cover was 8.3 percent on the Razor Pro (alone) plots, significantly higher than all other treatments including the untreated plots.

Tufted lovegrass cover on the Razor Pro plots was equal to the untreated plots (5%) at 2 MAT and significantly higher than the remaining treatments (0.7 to 1.3%). This pattern remained through 4 MAT.

At 1 YAT, cover of ryegrass (*Lolium multiflorum*) and smooth brome (*Bromus inermis*) was significantly lower in all treated plots compared to the untreated. Cover of slender aster (*Aster exilis*) was significantly higher in the untreated and Razor Pro (alone) plots compared to all other treated plots at 1 YAT.

Overall Cover:

A significant reduction on cover was observed at 1 MAT compared to the untreated (50%). Cover in the Razor Pro (alone) treated plots (5%) was significantly higher than all other treated plots. The statistical pattern remained at 2 MAT, but cover in the Razor Pro plots was up to 20% on average while all other treated plots remained at or below 5.7% on average.

Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

Protocol ID: HE15USADSG	Trial ID: HE15USADSG
Location: Brooksville, MS	Study Director: Victor Maddox
	Investigator: John Byrd

Results and Conclusions (Continued):

At 3 MAT, the same patter was observed but cover in the Razor Pro (alone) plots was 26.7% on average. This pattern remained through 4 MAT with cover on Razor Pro (alone) plots at 31.7%. Cover in the untreated remained at 50% at 4 MAT. The same pattern was observed at 1 YAT (Chart 84), when cover in the Razor Pro (alone) treatment was as 20%.

Overall Conclusions:

Based upon the results of this study, all treated plots except Razor Pro along performed well for the suppression of weeds in this study. The gravel area receiving these treatments remained relatively clear during the study and though the second year (2016) growing season (personal observation, data not shown).

Site and Design

Plot Width, Unit: 10	FT	Site Type: _____
Plot Length, Unit: 30	FT	Tillage Type: _____
Replications: 3		Study Design: Randomized Complete Block

Application Description

	A
Application Date:	5/12/15
Time of Day:	1:15 PM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	81 F
% Relative Humidity:	70
Wind Velocity, Unit:	6 MPH
Wind Direction:	SW
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	90

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	2 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Unit	Appl Code	Amt to Measure	Plot No. By Rep		
										1	2	3
01	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx	101	207	302
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
02	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	102	211	306
	HERB	Perspective	55.3	%AW/W	WG	8	oz/a	A	4.793 g/mx			
	HERB	Oust	75	%AW/W	WG	3	oz/a	A	1.797 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
03	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	103	209	310
	HERB	Perspective	55.3	%AW/W	WG	8	oz/a	A	4.793 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
04	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	104	210	303
	HERB	Streamline	52.1	%AW/W	WG	8	oz/a	A	4.793 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
05	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	105	203	309
	HERB	Method 240SL	240	GA/L	SL	12	oz/a	A	7.5 ml/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
06	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	106	213	307
	HERB	Viewpoint	61.7	%AW/W	WG	12	oz/a	A	7.19 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
07	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	107	206	308
	HERB	Telar	75	%AW/W	WG	1.5	oz/a	A	0.8987 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
08	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	108	204	312
	HERB	Method 240SL	240	GA/L	SL	12	oz/a	A	7.5 ml/mx			
	HERB	Plateau	2	LB/GAL	SL	8	oz/a	A	5.0 ml/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
09	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	109	202	313
	HERB	Method 240SL	240	GA/L	SL	12	oz/a	A	7.5 ml/mx			
	HERB	Matrix	25	%AW/W	WG	4	oz/a	A	2.397 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
10	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	110	205	301
	HERB	Matrix	25	%AW/W	WG	4	oz/a	A	2.397 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
11	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	111	201	311
	HERB	Hyvar X	80	%AW/W	WP	3	lb/a	A	28.76 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
12	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	112	208	304
	HERB	Opensite	71.58	%AW/W	WG	3.3	oz/a	A	1.977 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
13	CHK	Untreated Check						A		113	212	305

Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Smooth crab>	Kummerowia >	Tufted love>	Overall	Crabgrass	Japanese le>	Crabgrass	Japanese le>		
Rating Date		5/12/15	5/12/15	5/12/15	6/11/15	6/11/15	6/11/15	7/10/15	7/10/15		
Rating Data Type		GROUND	GROUND	GROUND	GROUND	CONTRO	CONTRO	CONTRO	CONTRO		
Rating Unit		%AREA	%AREA	%AREA	%AREA	%	%	%	%		
Trt	Treatment										
No.	Name	Rate	Unit	1	2	3	4	5	6	7	8
01	Razor Pro Induce	2 qt/a 0.25 % v/v		20.0	3.0	3.0	5.0 b	81.7 c	99.7 a	56.7 b	67.0 a
02	Esplanade Perspective Oust Razor Pro Induce	5 oz/a 8 oz/a 3 oz/a 2 qt/a 0.25 % v/v		20.0	2.3	4.0	1.3 cde	96.0 ab	100.0 a	96.0 a	100.0 a
03	Esplanade Perspective Razor Pro Induce	5 oz/a 8 oz/a 2 qt/a 0.25 % v/v		20.0	2.3	4.0	0.7 e	99.0 a	100.0 a	99.0 a	100.0 a
04	Esplanade Streamline Razor Pro Induce	5 oz/a 8 oz/a 2 qt/a 0.25 % v/v		20.0	3.0	3.0	1.0 de	99.0 a	100.0 a	99.0 a	100.0 a
05	Esplanade Method 240SL Razor Pro Induce	5 oz/a 12 oz/a 2 qt/a 0.25 % v/v		21.7	3.3	4.0	1.0 de	98.7 a	100.0 a	98.7 a	100.0 a
06	Esplanade Viewpoint Razor Pro Induce	5 oz/a 12 oz/a 2 qt/a 0.25 % v/v		20.0	3.3	4.0	1.0 de	99.0 a	100.0 a	99.0 a	100.0 a
07	Esplanade Telar Razor Pro Induce	5 oz/a 1.5 oz/a 2 qt/a 0.25 % v/v		21.7	3.3	3.0	2.3 cd	94.0 ab	100.0 a	94.0 a	100.0 a
08	Esplanade Method 240SL Plateau Razor Pro Induce	5 oz/a 12 oz/a 8 oz/a 2 qt/a 0.25 % v/v		18.3	3.3	5.0	1.0 de	99.0 a	100.0 a	98.7 a	100.0 a
09	Esplanade Method 240SL Matrix Razor Pro Induce	5 oz/a 12 oz/a 4 oz/a 2 qt/a 0.25 % v/v		18.3	3.3	5.0	1.0 de	99.0 a	100.0 a	99.0 a	100.0 a
10	Esplanade Matrix Razor Pro Induce	5 oz/a 4 oz/a 2 qt/a 0.25 % v/v		21.7	5.0	4.0	2.7 c	91.3 b	99.7 a	91.3 a	100.0 a
11	Esplanade Hyvar X Razor Pro Induce	5 oz/a 3 lb/a 2 qt/a 0.25 % v/v		18.3	2.3	5.0	0.7 e	99.3 a	100.0 a	99.3 a	100.0 a
12	Esplanade Opensite Razor Pro Induce	5 oz/a 3.3 oz/a 2 qt/a 0.25 % v/v		20.0	3.0	3.0	1.3 cde	97.7 a	100.0 a	97.3 a	100.0 a

Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

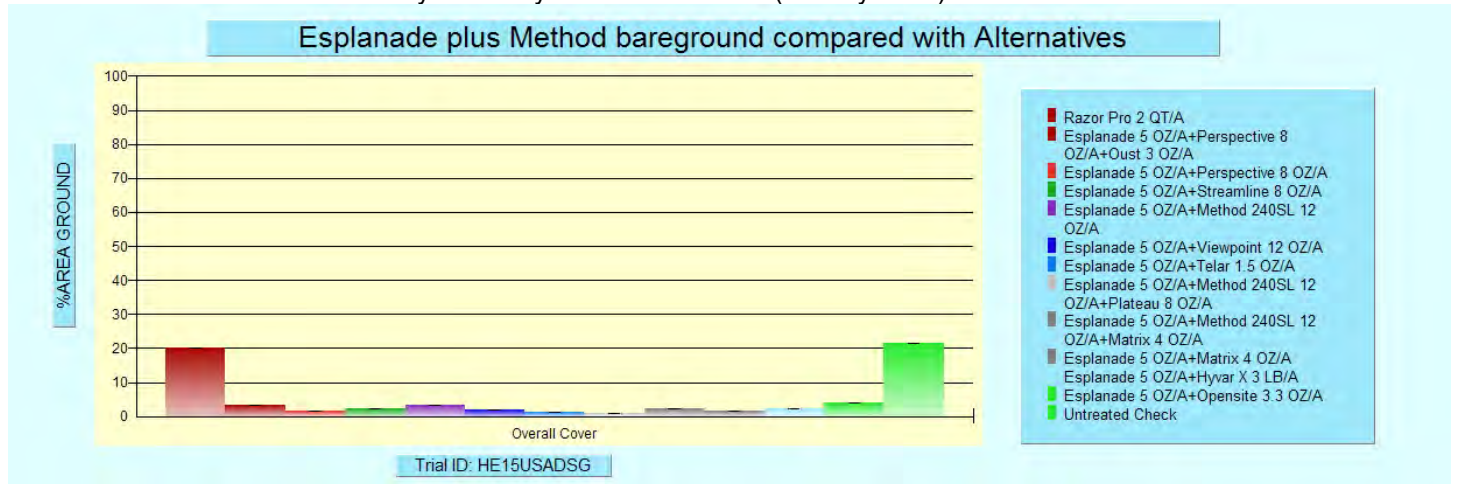
Protocol ID: HE15USADSG
 Location: Brooksville, MS

Trial ID: HE15USADSG
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Smooth crab>	Kummerowia >	Tufted love>	Overall	Crabgrass	Japanese le>	Crabgrass	Japanese le>
Rating Date	5/12/15	5/12/15	5/12/15	6/11/15	6/11/15	6/11/15	7/10/15	7/10/15
Rating Data Type	GROUND	GROUND	GROUND	GROUND	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%AREA	%AREA	%AREA	%AREA	%	%	%	%
Trt Treatment	1	2	3	4	5	6	7	8
No. Name	13 Untreated Check							
	20.0	3.0	3.0	50.0 a	0.0	0.0	0.0	0.0
LSD (P=Various)	4.91	2.18	1.91	1.54	6.20	0.38	20.17	27.94
Standard Deviation	2.91	1.29	1.14	0.92	3.66	0.22	11.91	16.50
CV	14.57	41.3	29.51	17.27	3.81	0.22	12.67	16.97
Bartlett's X2	3.907	1.871	0.0	9.101	19.327	0.0	54.617	0.0
P(Bartlett's X2)	0.985	0.999	1.00	0.105	0.007*	1.00	0.001*	.
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	29.208	31.544	11.284	1.099	0.449	2.200	1.534	1.000
Replicate Prob(F)	0.0001	0.0001	0.0004	0.3493	0.6439	0.1346	0.2379	0.3840
Treatment F	0.491	0.850	1.493	649.237	6.035	1.000	3.053	1.000
Treatment Prob(F)	0.9004	0.6029	0.1947	0.0001	0.0002	0.4767	0.0124	0.4767

Means followed by same letter do not differ significantly.

Chart 84. Overall cover on 12 May 2016 at year after treatment (12 May 2015).



Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Overall 7/10/15 GROUND %AREA	Ground spur> 7/10/15 GROUND %AREA	Tufted love> 7/10/15 GROUND %AREA	Crabgrass 8/10/15 CONTRO %	Japanese le> 8/10/15 CONTRO %	Overall 8/10/15 GROUND %AREA	Ground spur> 8/10/15 GROUND %AREA	Tufted love> 8/10/15 GROUND %AREA
Rating Date									
Rating Data Type									
Rating Unit									
Trt Treatment	Rate								
No. Name	Rate Unit	9	10	11	12	13	14	15	16
01 Razor Pro Induce	2 qt/a 0.25 % v/v	20.0 b	6.7 a	5.0 a	58.3 b	60.3 a	26.7 b	7.3 a	5.0 a
02 Esplanade Perspective Oust Razor Pro Induce	5 oz/a 8 oz/a 3 oz/a 2 qt/a 0.25 % v/v	4.7 cd	0.7 b	1.3 b	97.7 a	100.0 a	4.3 c	0.7 bc	1.3 b
03 Esplanade Perspective Razor Pro Induce	5 oz/a 8 oz/a 2 qt/a 0.25 % v/v	2.7 cde	0.3 b	1.3 b	99.0 a	100.0 a	2.0 c	0.7 bc	1.0 bc
04 Esplanade Streamline Razor Pro Induce	5 oz/a 8 oz/a 2 qt/a 0.25 % v/v	2.0 de	0.3 b	1.0 bc	99.0 a	100.0 a	1.3 c	0.7 bc	1.0 bc
05 Esplanade Method 240SL Razor Pro Induce	5 oz/a 12 oz/a 2 qt/a 0.25 % v/v	2.3 cde	0.0 b	1.3 b	98.7 a	100.0 a	2.0 c	0.0 c	1.3 b
06 Esplanade Viewpoint Razor Pro Induce	5 oz/a 12 oz/a 2 qt/a 0.25 % v/v	1.3 de	0.0 b	1.0 bc	99.0 a	100.0 a	1.3 c	0.7 bc	1.0 bc
07 Esplanade Telar Razor Pro Induce	5 oz/a 1.5 oz/a 2 qt/a 0.25 % v/v	5.7 c	0.7 b	1.3 b	97.3 a	100.0 a	3.3 c	1.3 bc	1.0 bc
08 Esplanade Method 240SL Plateau Razor Pro Induce	5 oz/a 12 oz/a 8 oz/a 2 qt/a 0.25 % v/v	1.7 de	0.0 b	1.0 bc	99.3 a	100.0 a	0.7 c	0.0 c	0.7 c
09 Esplanade Method 240SL Matrix Razor Pro Induce	5 oz/a 12 oz/a 4 oz/a 2 qt/a 0.25 % v/v	2.0 de	0.0 b	1.3 b	99.0 a	100.0 a	1.7 c	0.0 c	1.0 bc
10 Esplanade Matrix Razor Pro Induce	5 oz/a 4 oz/a 2 qt/a 0.25 % v/v	4.0 cde	0.3 b	1.0 bc	94.3 a	96.7 a	4.0 c	0.3 bc	1.0 bc
11 Esplanade Hyvar X Razor Pro Induce	5 oz/a 3 lb/a 2 qt/a 0.25 % v/v	1.0 e	0.0 b	0.7 c	99.3 a	100.0 a	1.0 c	0.0 c	0.7 c
12 Esplanade Opensite Razor Pro Induce	5 oz/a 3.3 oz/a 2 qt/a 0.25 % v/v	3.3 cde	0.7 b	1.0 bc	97.3 a	100.0 a	3.3 c	2.0 b	1.0 bc

Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Overall 7/10/15	Ground spur> 7/10/15	Tufted love> 7/10/15	Crabgrass 8/10/15	Japanese le> 8/10/15	Overall 8/10/15	Ground spur> 8/10/15	Tufted love> 8/10/15
Rating Date	GROUND	GROUND	GROUND	CONTRO	CONTRO	GROUND	GROUND	GROUND
Rating Data Type	%AREA	%AREA	%AREA	%	%	%AREA	%AREA	%AREA
Rating Unit								
Trt Treatment	9	10	11	12	13	14	15	16
No. Name Rate Unit								
13 Untreated Check	50.0 a	1.3 b	5.0 a	0.0	0.0	50.0 a	1.7 bc	5.0 a
LSD (P=Various)	3.59	1.59	0.66	22.58	25.49	3.74	1.70	0.65
Standard Deviation	2.13	0.94	0.39	13.33	15.05	2.22	1.01	0.39
CV	27.53	111.42	22.67	14.05	15.61	28.38	85.68	23.94
Bartlett's X2	19.218	13.083	0.0	64.791	5.97	21.379	8.548	1.1
P(Bartlett's X2)	0.038*	0.07	1.00	0.001*	0.015*	0.03*	0.382	0.894
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	0.175	1.125	1.183	1.461	1.238	0.318	0.402	3.600
Replicate Prob(F)	0.8406	0.3412	0.3236	0.2536	0.3094	0.7309	0.6736	0.0429
Treatment F	122.533	10.851	42.789	2.268	1.721	126.330	11.293	46.000
Treatment Prob(F)	0.0001	0.0001	0.0001	0.0492	0.1340	0.0001	0.0001	0.0001

Means followed by same letter do not differ significantly.

Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Crabgrass	Japanese le>	Overall	Ground spur>	Tufted love>	Crabgrass	Overall	Bermuda gra>		
Rating Date		9/8/15	9/8/15	9/8/15	9/8/15	9/8/15	5/12/16	5/12/16	5/12/16		
Rating Data Type		CONTRO	CONTRO	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit		%	%	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Trt	Treatment										
No.	Name	Rate	Unit	17	18	19	20	21	22	23	24
01	Razor Pro Induce	2 qt/a 0.25 % v/v		56.7 a	58.3 a	31.7 b	8.3 a	5.0 a	3.0 a	20.0 a	0.7 a
02	Esplanade Perspective Oust Razor Pro Induce	5 oz/a 8 oz/a 3 oz/a 2 qt/a 0.25 % v/v		97.7 a	100.0 a	4.3 c	0.7 bc	1.0 c	0.3 b	3.3 b	0.0 a
03	Esplanade Perspective Razor Pro Induce	5 oz/a 8 oz/a 2 qt/a 0.25 % v/v		99.0 a	100.0 a	2.0 cd	0.7 bc	0.7 c	0.0 b	1.7 b	0.0 a
04	Esplanade Streamline Razor Pro Induce	5 oz/a 8 oz/a 2 qt/a 0.25 % v/v		99.0 a	100.0 a	1.3 cd	0.7 bc	1.0 c	0.0 b	2.3 b	0.7 a
05	Esplanade Method 240SL Razor Pro Induce	5 oz/a 12 oz/a 2 qt/a 0.25 % v/v		98.7 a	100.0 a	2.0 cd	0.3 bc	1.0 c	0.3 b	3.3 b	0.3 a
06	Esplanade Viewpoint Razor Pro Induce	5 oz/a 12 oz/a 2 qt/a 0.25 % v/v		99.0 a	100.0 a	1.7 cd	1.0 bc	1.0 c	0.3 b	2.0 b	0.0 a
07	Esplanade Telar Razor Pro Induce	5 oz/a 1.5 oz/a 2 qt/a 0.25 % v/v		97.3 a	100.0 a	3.3 cd	2.0 b	1.0 c	0.3 b	1.3 b	0.0 a
08	Esplanade Method 240SL Plateau Razor Pro Induce	5 oz/a 12 oz/a 8 oz/a 2 qt/a 0.25 % v/v		99.3 a	100.0 a	0.7 d	0.0 c	0.7 c	0.3 b	1.0 b	0.0 a
09	Esplanade Method 240SL Matrix Razor Pro Induce	5 oz/a 12 oz/a 4 oz/a 2 qt/a 0.25 % v/v		99.0 a	100.0 a	1.7 cd	0.0 c	1.0 c	0.7 b	2.3 b	0.0 a
10	Esplanade Matrix Razor Pro Induce	5 oz/a 4 oz/a 2 qt/a 0.25 % v/v		94.3 a	96.3 a	3.7 cd	1.0 bc	1.0 c	0.3 b	1.7 b	0.0 a
11	Esplanade Hyvar X Razor Pro Induce	5 oz/a 3 lb/a 2 qt/a 0.25 % v/v		99.3 a	100.0 a	1.0 cd	0.0 c	0.7 c	0.7 b	2.3 b	0.0 a
12	Esplanade Opensite Razor Pro Induce	5 oz/a 3.3 oz/a 2 qt/a 0.25 % v/v		97.3 a	100.0 a	3.3 cd	2.0 b	1.0 c	0.3 b	4.0 b	0.7 a

Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Crabgrass	Japanese le>	Overall	Ground spur>	Tufted love>	Crabgrass	Overall	Bermuda gra>
Rating Date	9/8/15	9/8/15	9/8/15	9/8/15	9/8/15	5/12/16	5/12/16	5/12/16
Rating Data Type	CONTRO	CONTRO	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Unit	%	%	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA
Trt Treatment	Rate							
No. Name	Rate Unit							
13 Untreated Check	17	18	19	20	21	22	23	24
	0.0	0.0	50.0 a	1.7 bc	4.3 b	3.7 a	21.7 a	0.3 a
LSD (P=Various)	23.96	24.87	3.45	1.93	0.54	1.34	5.71	0.85
Standard Deviation	14.15	14.68	2.05	1.14	0.32	0.80	3.39	0.50
CV	14.94	15.26	24.99	81.02	21.53	100.22	65.73	244.79
Bartlett's X2	66.45	6.056	18.642	9.407	0.0	9.053	27.455	2.204
P(Bartlett's X2)	0.001*	0.014*	0.068	0.401	0.001*	0.527	0.007*	0.698
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	1.434	1.237	0.372	0.255	1.000	1.131	0.288	2.542
Replicate Prob(F)	0.2597	0.3097	0.6932	0.7767	0.3827	0.3392	0.7521	0.0997
Treatment F	2.182	1.996	160.528	11.070	59.375	6.263	12.877	1.000
Treatment Prob(F)	0.0575	0.0807	0.0001	0.0001	0.0001	0.0001	0.0001	0.4777

Means followed by same letter do not differ significantly.

Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Italian rye>	Smooth brome	Slender ast>
Rating Date		5/12/16	5/12/16	5/12/16
Rating Data Type		GROUND	GROUND	GROUND
Rating Unit		%AREA	%AREA	%AREA
Trt No.	Treatment Name	Rate	Unit	
		25	26	27
01	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	1.7 b	0.3 b
02	Esplanade	5 oz/a		
	Perspective	8 oz/a		
	Oust	3 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	1.0 b	0.0 b
03	Esplanade	5 oz/a		
	Perspective	8 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	1.0 b	0.0 b
04	Esplanade	5 oz/a		
	Streamline	8 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	0.7 b	0.0 b
05	Esplanade	5 oz/a		
	Method 240SL	12 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	0.3 b	0.0 b
06	Esplanade	5 oz/a		
	Viewpoint	12 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	0.3 b	0.0 b
07	Esplanade	5 oz/a		
	Telar	1.5 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	0.3 b	0.0 b
08	Esplanade	5 oz/a		
	Method 240SL	12 oz/a		
	Plateau	8 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	0.0 b	0.0 b
09	Esplanade	5 oz/a		
	Method 240SL	12 oz/a		
	Matrix	4 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	0.3 b	0.0 b
10	Esplanade	5 oz/a		
	Matrix	4 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	0.3 b	0.0 b
11	Esplanade	5 oz/a		
	Hyvar X	3 lb/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	0.3 b	0.3 b
12	Esplanade	5 oz/a		
	Opensite	3.3 oz/a		
	Razor Pro	2 qt/a		
	Induce	0.25 % v/v	0.7 b	0.0 b

Esplanade plus Method bareground compared with Alternatives - Crabgrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Italian rye>	Smooth brome	Slender ast>
Rating Date	5/12/16	5/12/16	5/12/16
Rating Data Type	GROUND	GROUND	GROUND
Rating Unit	%AREA	%AREA	%AREA
Trt Treatment			
No. Name	25	26	27
Rate Unit			
13 Untreated Check	5.3 a	1.3 a	10.0 a
LSD (P=Various)	2.12	0.49	2.43
Standard Deviation	1.26	0.29	1.44
CV	132.63	187.64	56.89
Bartlett's X2	19.678	0.0	11.438
P(Bartlett's X2)	0.05*	1.00	0.324
Mean Sep. Test	LSD.05	LSD.05	LSD.05
Replicate F	4.000	0.000	3.984
Replicate Prob(F)	0.0317	1.0000	0.0321
Treatment F	3.644	5.077	13.227
Treatment Prob(F)	0.0034	0.0004	0.0001

Means followed by same letter do not differ significantly.

Esplanade plus Method bareground compared with Alternatives - Johnsongrass

Protocol ID: HE15USADSG
Location: Crawford, MS

Trial ID: HE15USADSG
Study Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Title: _____
Title: _____

Trial Location

City: Crawford
State/Prov.: MS

Trial Status: _____
Trial Reliability: _____

Conducted Under GLP: _
Conducted Under GEP: X

Official Trial Code: _____
Other Trial Code: _____

Results and Conclusions:

This study evaluates the effects of bareground treatments on johnsongrass (*Sorghum halepense*). All treated plots received 2 qt/A Razor Pro at the time of application (0 DAT) on 8 May 2015. The study was applied to the gravel clear zone adjacent to the pavement with some slope. Short or no vegetation is preferred in this area to prevent vehicle fires, or fire in general, and for other safety reasons.

At 0 DAT, johnsongrass, small hop clover (*Trifolium dubium*), Carolina geranium (*Geranium carolinianum*), common vetch (*Vicia sativa*), and buckhorn plantain (*Plantago lanceolata*) were the dominant weeds species across the study. Prickly lettuce (*Lactuca scariola*), annual ryegrass (*Lolium multiflorum*), and southern dewberry (*Rubus trivialis*) were also present.

Weed Responses:

Cool-Season Weeds. Control of small hop clover, Carolina geranium, common vetch, buckhorn plantain, prickly lettuce, and annual ryegrass were all 100% at 1 MAT.

Warm-Season Grassy Weeds. Control of Johnsongrass was observed at 1 MAT (31 DAT) (Chart 85). Most treatments showed over 90% control. Esplanade plus Hyvar X treatment had significantly less control of johnsongrass at 1 MAT (73.3%) compared to all other treated plots. This trend remained through 4 MAT, but was not significantly lower than Esplanade treatments with Streamline, Telar, or Opensight at 4 MAT. At 4 MAT, the best treatment was Esplanade plus Perspective and Oust (91.3%), but it was not significantly better than six of the other treatments including the Razor Pro alone treatment. Some control was evident at 1 YAT, since johnsongrass cover was significantly lower in all treatment plots, except Esplanade plus Hyvar X (56.7%) and the untreated (63.3%) (Chart 86). Based on these observations, Esplanade and Hyvar X may be antagonistic in the control of johnsongrass, and possibly bermudagrass (see below). This needs further study since tank mixing the two may be problematic for control of these, and possibly similar grasses.

At 3 MAT, bermudagrass (*Cynodon dactylon*) cover was highest in the treatment with Esplanade and Hyvar X, although it was not significant compared to four other treatments in the study. This is similar to the response observed with johnsongrass, and may need further study.

At 4 MAT, southern crabgrass (*Digitaria ciliaris*) cover was significantly higher in the Razor Pro alone treatment. This likely indicates the pre-emergence activity of the other treatments. Interestingly, the crabgrass cover in the untreated was not significantly less than treatments with Esplanade. This again is likely due to the presence of weed competition in the untreated plots which had 100% cover at 4 MAT.

Purple nutsedge (*Cyperus rotundus*) is another species that showed wide variability in cover across plots in the study. At 3 MAT, cover ranged from 3.3 to 56.7%, but was not significant (Chart 87). Interestingly, both of the treatments with the highest cover contained Method (12 oz/A). The only other treatment with Method, which had far less purple nutsedge cover (3.3%) also contained Plateau. This might also be of interest for further studies, particularly since the untreated also had 3.3% purple nutsedge cover and all other treatments had 6.7 to 56.7% cover. This pattern remained through 4 MAT. It is likely that purple nutsedge was released by most treatments in this study, but needs further study.

Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

Protocol ID: HE15USADSG
 Location: Brooksville, MS

Trial ID: HE15USADSG
 Study Director: Victor Maddox
 Investigator: John Byrd

Results and Conclusions (Continued):

Warm-Season Broadleaf Weeds. AT 1 MAT, some products were not as effective on southern dewberry, particularly treatments with Esplanade plus Hyvar X (50%) and Esplanade plus Matrix (30%). All other products showed significantly more control of southern dewberry. This pattern remained through 2 MAT, but by 3 MAT southern dewberry control in the treatment with Esplanade plus Matrix increased from 30% control at 2 MAT to 100% control.

Hophornbeam copperleaf (*Acalypha ostryifolia*) ground cover indicated control in all treatments except Razor Pro alone. Interestingly, it was absent in the untreated. This is likely due to competition with other weeds in the untreated plots, an indication that hophornbeam copperleaf prefers open sites for establishment. Although it was not significant, hophornbeam cover was higher in two treatments with Method (11.7 and 8.3%, respectively). This may be of interest for further studies.

There were no significant differences in trumpet creeper (*Campsis radicans*) cover at 3 MAT, despite average cover ranging from 1.7 to 30%. Treatments with the highest trumpet creeper cover included Esplanade plus Telar (20%) and Esplanade plus Opensight (15%). This might also be of interest for further studies, particularly since the untreated plots only had 8.3% cover on average.

There were no significant differences in toothed spurge (*Euphorbia dentata*) cover at 3 MAT, although some treatments had 0% cover. This included the untreated plots, but like hophornbeam copperleaf, it may require open areas to establish and there was too much weed cover in the untreated plots. This pattern remained through 4 MAT. Interestingly, Esplanade plus Telar had the highest toothed spurge cover at 3 (8.3%) and 4 (11.7%) MAT. This may be of interest for further study, possibly with other *Euphorbia* species, as well.

There were significant differences in nodding spurge (*Chamaesyce nutans*) cover at 4 MAT. As expected, the Razor Pro alone treatment had significantly more nodding spurge cover, compared to all other treatments including the untreated. There was 0% nodding spurge cover in some treatments including the untreated. Interestingly, the cover patterns did not match those of toothed spurge (*Euphorbia dentata*), a related species, at 4 MAT. However, both may prefer open sites for establishment based upon 0% cover in the untreated plots.

Despite very low average percent cover in some treatment plots, there were no significant differences in Canada goldenrod (*Solidago canadensis*) at 4 MAT.

At 1 YAT, cover of ryegrass (*Lolium multiflorum*) and smooth brome (*Bromus inermis*) was significantly lower in all treated plots compared to the untreated. Cover of slender aster (*Aster exilis*) was significantly higher in the untreated and Razor Pro (alone) plots compared to all other treated plots at 1 YAT.

Overall Cover:

Overall cover was relatively high at 4 MAT across all treatments (Chart 88). Cover in treated plots ranged from 53 to 86.7%. However, cover in the untreated was at 100% at 4 MAT. A similar pattern was observed at 1 YAT (Chart 89). Still, as bare ground study, much less cover would have been more desirable at least at 4 MAT.

Overall Conclusions:

Based upon the results of this study, bareground was difficult to achieve with these treatments. Some treatments were effective on some species, but not effective on all species observed in the study. Most were better than Razor Pro alone, however. Interestingly, the cover in the untreated seemed to prevent the establishment of some species that were problematic in other treatments. This should be a consideration in studies of this type when comparing treat plots with untreated. It also complicates studies of this type.

Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

Protocol ID: HE15USADSG
 Location: Brooksville, MS

Trial ID: HE15USADSG
 Study Director: Victor Maddox
 Investigator: John Byrd

Site and Design

Plot Width, Unit: 10 FT Site Type: _____
 Plot Length, Unit: 30 FT Tillage Type: _____
 Replications: 3 Study Design: Randomized Complete Block

Application Description

	A
Application Date:	5/8/15
Time of Day:	2:00 PM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	86 F
% Relative Humidity:	56
Wind Velocity, Unit:	6 MPH
Wind Direction:	W
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	55

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

 Protocol ID: HE15USADSG
 Location: Brooksville, MS

 Trial ID: HE15USADSG
 Study Director: Victor Maddox
 Investigator: John Byrd

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
01	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx	101	207	302
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
02	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	102	211	306
	HERB	Perspective	55.3	%AW/W	WG	8	oz/a	A	4.793 g/mx			
	HERB	Oust	75	%AW/W	WG	3	oz/a	A	1.797 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
03	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	103	209	310
	HERB	Perspective	55.3	%AW/W	WG	8	oz/a	A	4.793 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
04	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	104	210	303
	HERB	Streamline	52.1	%AW/W	WG	8	oz/a	A	4.793 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
05	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	105	203	309
	HERB	Method 240SL	240	GA/L	SL	12	oz/a	A	7.5 ml/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
06	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	106	213	307
	HERB	Viewpoint	61.7	%AW/W	WG	12	oz/a	A	7.19 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
07	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	107	206	308
	HERB	Telar	75	%AW/W	WG	1.5	oz/a	A	0.8987 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
08	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	108	204	312
	HERB	Method 240SL	240	GA/L	SL	12	oz/a	A	7.5 ml/mx			
	HERB	Plateau	2	LB/GAL	SL	8	oz/a	A	5.0 ml/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
09	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	109	202	313
	HERB	Method 240SL	240	GA/L	SL	12	oz/a	A	7.5 ml/mx			
	HERB	Matrix	25	%AW/W	WG	4	oz/a	A	2.397 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
10	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	110	205	301
	HERB	Matrix	25	%AW/W	WG	4	oz/a	A	2.397 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
11	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	111	201	311
	HERB	Hyvar X	80	%AW/W	WP	3	lb/a	A	28.76 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
12	HERB	Esplanade	200	GA/L	SC	5	oz/a	A	3.125 ml/mx	112	208	304
	HERB	Opensite	71.58	%AW/W	WG	3.3	oz/a	A	1.977 g/mx			
	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	40.0 ml/mx			
	ADJ	Induce	480	GA/L	XX	0.25	% v/v	A	4.999 ml/mx			
13	CHK	Untreated Check						A		113	212	305

Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Johnson gra>	Small hop c>	Carolina ge>	Common vetch	Buckhorn pl>	Prickly let>	Italian rye>		
Rating Date		5/8/15	5/8/15	5/8/15	5/8/15	5/8/15	5/8/15	5/8/15		
Rating Data Type		GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit		%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Trt No.	Treatment Name	Rate	Unit	1	2	3	4	5	6	7
01	Razor Pro Induce	2 qt/a 0.25 % v/v		53.3	38.3	8.3	10.0	35.0	3.3	13.3
02	Esplanade Perspective Oust Razor Pro Induce	5 oz/a 8 oz/a 3 oz/a 2 qt/a 0.25 % v/v		50.0	33.3	8.3	13.3	43.3	0.7	8.3
03	Esplanade Perspective Razor Pro Induce	5 oz/a 8 oz/a 2 qt/a 0.25 % v/v		53.3	33.3	16.7	13.3	36.7	3.3	7.3
04	Esplanade Streamline Razor Pro Induce	5 oz/a 8 oz/a 2 qt/a 0.25 % v/v		56.7	30.0	10.0	16.7	33.3	4.0	5.7
05	Esplanade Method 240SL Razor Pro Induce	5 oz/a 12 oz/a 2 qt/a 0.25 % v/v		56.7	33.3	13.3	10.0	28.3	8.3	3.0
06	Esplanade Viewpoint Razor Pro Induce	5 oz/a 12 oz/a 2 qt/a 0.25 % v/v		46.7	36.7	5.7	11.7	43.3	3.3	9.0
07	Esplanade Telar Razor Pro Induce	5 oz/a 1.5 oz/a 2 qt/a 0.25 % v/v		46.7	30.0	8.3	10.0	30.0	9.0	14.0
08	Esplanade Method 240SL Plateau Razor Pro Induce	5 oz/a 12 oz/a 8 oz/a 2 qt/a 0.25 % v/v		50.0	31.7	11.7	11.7	30.0	9.0	8.0
09	Esplanade Method 240SL Matrix Razor Pro Induce	5 oz/a 12 oz/a 4 oz/a 2 qt/a 0.25 % v/v		53.3	28.3	21.7	8.3	23.3	8.3	4.7
10	Esplanade Matrix Razor Pro Induce	5 oz/a 4 oz/a 2 qt/a 0.25 % v/v		50.0	33.3	11.7	10.0	33.3	5.0	6.7
11	Esplanade Hyvar X Razor Pro Induce	5 oz/a 3 lb/a 2 qt/a 0.25 % v/v		56.7	25.0	21.7	16.7	20.0	5.0	4.0
12	Esplanade Opensite Razor Pro Induce	5 oz/a 3.3 oz/a 2 qt/a 0.25 % v/v		53.3	36.7	11.7	8.3	36.7	5.0	4.0

Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

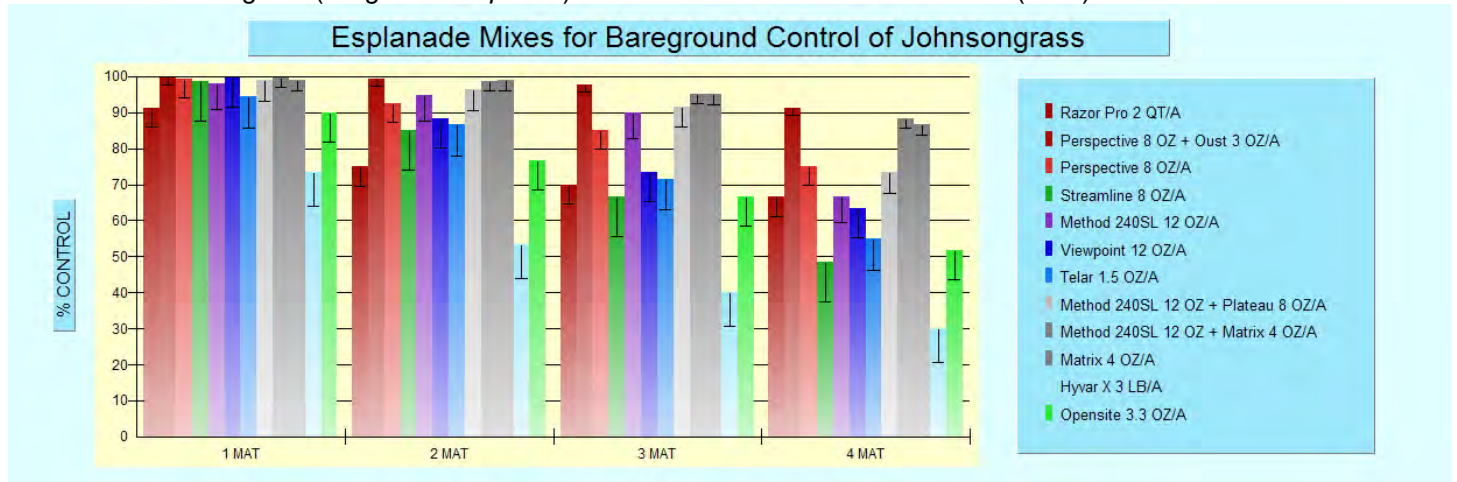
Protocol ID: HE15USADSG
 Location: Brooksville, MS

Trial ID: HE15USADSG
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Johnson gra>	Small hop c>	Carolina ge>	Common vetch	Buckhorn pl>	Prickly let>	Italian rye>
Rating Date	5/8/15	5/8/15	5/8/15	5/8/15	5/8/15	5/8/15	5/8/15
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA
Trt Treatment							
No. Name	1	2	3	4	5	6	7
Rate Unit							
13 Untreated Check	53.3	36.7	6.7	16.7	43.3	1.7	4.0
LSD (P=Various)	10.65	10.58	7.39	11.36	17.91	7.28	8.78
Standard Deviation	6.32	6.28	4.38	6.74	10.63	4.32	5.21
CV	12.08	19.13	36.61	55.95	31.64	85.09	73.62
Bartlett's X2	2.791	3.144	7.888	10.336	0.173	8.258	22.54
P(Bartlett's X2)	0.997	0.994	0.794	0.50	1.00	0.69	0.032*
Mean Sep. Test							
Replicate F	43.893	60.504	6.630	2.298	131.898	8.916	10.291
Replicate Prob(F)	0.0001	0.0001	0.0051	0.1221	0.0001	0.0013	0.0006
Treatment F	0.888	1.106	4.211	0.616	1.437	1.251	1.347
Treatment Prob(F)	0.5703	0.3993	0.0013	0.8082	0.2167	0.3078	0.2571

Means followed by same letter do not differ significantly.

Chart 85. Johnsongrass (*Sorghum halepense*) control 1 to 4 months after treatment (MAT).



Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Southern de>	Johnson gra>	Small hop c>	Carolina ge>	Common vetch	Buckhorn pl>	Prickly let>
Rating Date		5/8/15	6/8/15	6/8/15	6/8/15	6/8/15	6/8/15	6/8/15
Rating Data Type		GROUND	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit		%AREA	%	%	%	%	%	%
Trt	Treatment							
No.	Name	8	9	10	11	12	13	14
01	Razor Pro Induce	10.0	91.3 bc	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	2 qt/a							
	0.25 % v/v							
02	Esplanade Perspective Oust Razor Pro Induce	6.7	99.7 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	8 oz/a							
	3 oz/a							
	2 qt/a							
	0.25 % v/v							
03	Esplanade Perspective Razor Pro Induce	8.3	99.3 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	8 oz/a							
	2 qt/a							
	0.25 % v/v							
04	Esplanade Streamline Razor Pro Induce	6.7	98.7 ab	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	8 oz/a							
	2 qt/a							
	0.25 % v/v							
05	Esplanade Method 240SL Razor Pro Induce	3.3	98.0 ab	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	12 oz/a							
	2 qt/a							
	0.25 % v/v							
06	Esplanade Viewpoint Razor Pro Induce	6.7	99.7 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	12 oz/a							
	2 qt/a							
	0.25 % v/v							
07	Esplanade Telar Razor Pro Induce	8.3	94.3 abc	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	1.5 oz/a							
	2 qt/a							
	0.25 % v/v							
08	Esplanade Method 240SL Plateau Razor Pro Induce	6.7	99.0 ab	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	12 oz/a							
	8 oz/a							
	2 qt/a							
	0.25 % v/v							
09	Esplanade Method 240SL Matrix Razor Pro Induce	8.3	99.7 a	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	12 oz/a							
	4 oz/a							
	2 qt/a							
	0.25 % v/v							
10	Esplanade Matrix Razor Pro Induce	3.3	99.0 ab	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	4 oz/a							
	2 qt/a							
	0.25 % v/v							
11	Esplanade Hyvar X Razor Pro Induce	3.3	73.3 d	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	3 lb/a							
	2 qt/a							
	0.25 % v/v							
12	Esplanade Opensite Razor Pro Induce	5.0	90.0 c	100.0 a	100.0 a	100.0 a	100.0 a	100.0 a
	Rate Unit							
	5 oz/a							
	3.3 oz/a							
	2 qt/a							
	0.25 % v/v							

Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

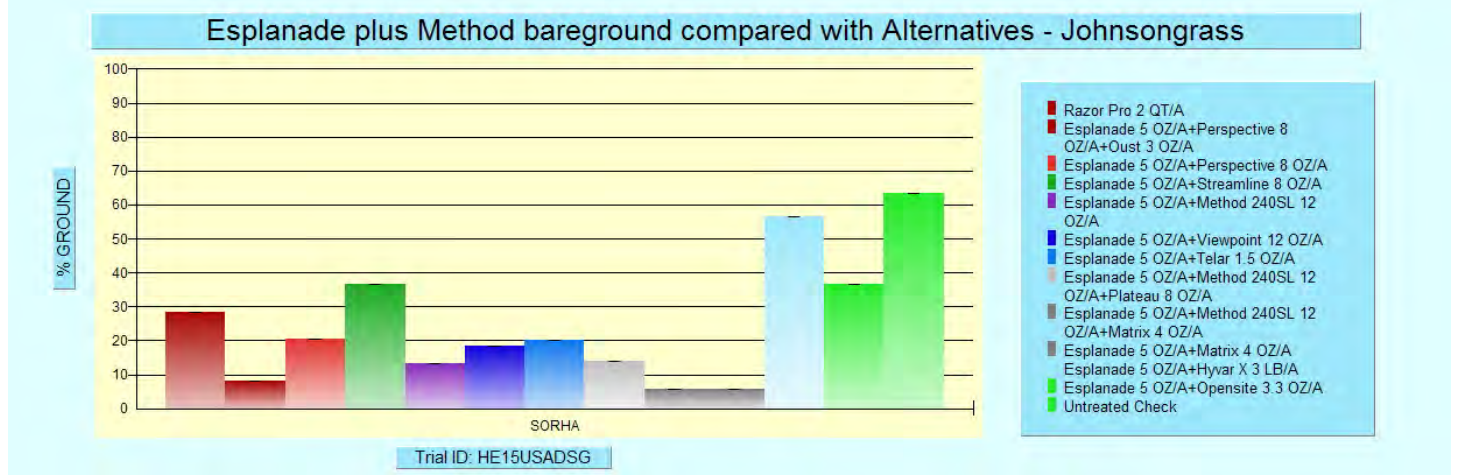
Protocol ID: HE15USADSG
 Location: Brooksville, MS

Trial ID: HE15USADSG
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Southern de>	Johnson gra>	Small hop c>	Carolina ge>	Common vetch	Buckhorn pl>	Prickly let>
Rating Date	5/8/15	6/8/15	6/8/15	6/8/15	6/8/15	6/8/15	6/8/15
Rating Data Type	GROUND	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%AREA	%	%	%	%	%	%
Trt Treatment							
No. Name	8	9	10	11	12	13	14
Rate Unit							
13 Untreated Check	3.3	0.0	0.0	0.0	0.0	0.0	0.0
LSD (P=Various)	8.06	7.86	0.00	0.00	0.00	0.00	0.00
Standard Deviation	4.78	4.64	0.00	0.00	0.00	0.00	0.00
CV	77.7	4.88	0.0	0.0	0.0	0.0	0.0
Bartlett's X2	9.163	37.423	0.0	0.0	0.0	0.0	0.0
P(Bartlett's X2)	0.689	0.001*	.	.	.	.	.
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	0.757	4.435	0.000	0.000	0.000	0.000	0.000
Replicate Prob(F)	0.4799	0.0241	1.0000	1.0000	1.0000	1.0000	1.0000
Treatment F	0.692	8.181	0.000	0.000	0.000	0.000	0.000
Treatment Prob(F)	0.7437	0.0001	1.0000	1.0000	1.0000	1.0000	1.0000

Means followed by same letter do not differ significantly.

Chart 86. Johnsongrass (*Sorghum halepense*) cover 1 year after treatments (YAT) (9 May 2016) applied on 8 May 2015.



Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Italian rye>	Southern de>	Johnson gra>	Southern de>	Johnson gra>	Southern de>	Hophornbeam>
Rating Date		6/8/15	6/8/15	7/7/15	7/7/15	8/6/15	8/6/15	8/6/15
Rating Data Type		CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	GROUND
Rating Unit		%	%	%	%	%	%	%
Trt Treatment	Rate							
No. Name	Rate Unit	15	16	17	18	19	20	21
01 Razor Pro	2 qt/a	100.0 a	51.7 cd	75.0 c	96.7 a	70.0 cd	95.0 a	36.7 a
Induce	0.25 % v/v							
02 Esplanade	5 oz/a	100.0 a	100.0 a	99.3 a	100.0 a	97.7 a	100.0 a	3.3 b
Perspective	8 oz/a							
Oust	3 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
03 Esplanade	5 oz/a	100.0 a	99.7 a	92.7 ab	100.0 a	85.0 abc	99.7 a	0.0 b
Perspective	8 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
04 Esplanade	5 oz/a	100.0 a	83.3 abc	85.0 bc	93.3 a	66.7 d	93.3 a	0.0 b
Streamline	8 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
05 Esplanade	5 oz/a	100.0 a	100.0 a	94.7 ab	100.0 a	90.0 ab	100.0 a	0.0 b
Method 240SL	12 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
06 Esplanade	5 oz/a	100.0 a	100.0 a	88.3 abc	100.0 a	73.3 bcd	100.0 a	3.3 b
Viewpoint	12 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
07 Esplanade	5 oz/a	100.0 a	30.0 d	86.7 abc	100.0 a	71.7 cd	100.0 a	3.3 b
Telar	1.5 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
08 Esplanade	5 oz/a	100.0 a	86.3 ab	96.3 ab	99.7 a	91.7 a	98.3 a	11.7 b
Method 240SL	12 oz/a							
Plateau	8 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
09 Esplanade	5 oz/a	100.0 a	93.3 a	98.7 ab	100.0 a	95.0 a	100.0 a	8.3 b
Method 240SL	12 oz/a							
Matrix	4 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
10 Esplanade	5 oz/a	100.0 a	53.3 bcd	99.0 a	30.0 c	95.0 a	100.0 a	4.0 b
Matrix	4 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
11 Esplanade	5 oz/a	100.0 a	30.3 d	53.3 d	50.0 b	40.0 e	50.0 b	0.0 b
Hyvar X	3 lb/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
12 Esplanade	5 oz/a	100.0 a	66.7 abc	76.7 c	100.0 a	66.7 d	100.0 a	0.0 b
Opensite	3.3 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							

Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

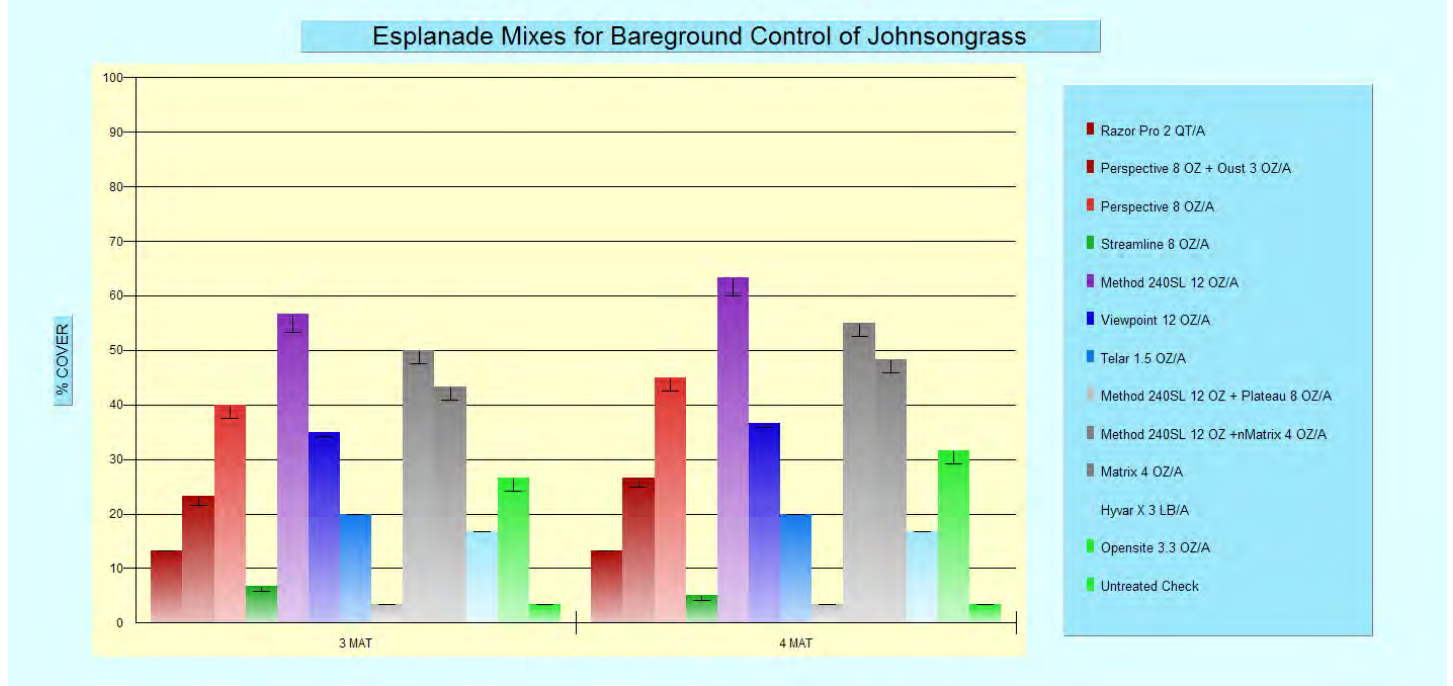
Protocol ID: HE15USADSG
 Location: Brooksville, MS

Trial ID: HE15USADSG
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Italian rye>	Southern de>	Johnson gra>	Southern de>	Johnson gra>	Southern de>	Hophornbeam>
Rating Date	6/8/15	6/8/15	7/7/15	7/7/15	8/6/15	8/6/15	8/6/15
Rating Data Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	GROUND
Rating Unit	%	%	%	%	%	%	%
Trt Treatment							
No. Name	15	16	17	18	19	20	21
Rate							
Unit							
13 Untreated Check	0.0	0.0	0.0	0.0	0.0	0.0	0.0 b
LSD (P=Various)	0.06	33.50	13.68	7.14	18.17	7.06	14.86
Standard Deviation	0.03	19.73	8.08	4.13	10.73	4.08	8.82
CV	0.03	26.46	9.27	4.63	13.66	4.31	162.17
Bartlett's X2	0.0	15.877	27.503	10.91	13.679	10.91	23.472
P(Bartlett's X2)	.	0.014*	0.002*	0.004*	0.134	0.004*	0.001*
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	0.000	5.591	13.210	0.344	5.036	0.527	1.229
Replicate Prob(F)	1.0000	0.0113	0.0002	0.7138	0.0158	0.6002	0.3104
Treatment F	0.000	5.694	8.358	96.801	7.500	36.596	3.909
Treatment Prob(F)	1.0000	0.0003	0.0001	0.0001	0.0001	0.0001	0.0022

Means followed by same letter do not differ significantly.

Chart 87. Purple nutsedge (*Cyperus rotundus*) cover 3 and 4 months after treatment (MAT).



Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Trumpetree>	Toothed spu>	Purple nutg>	Bermuda gra>	Overall Cov>	Johnson gra>	Purple nutg>	
Rating Date	8/6/15	8/6/15	8/6/15	8/6/15	9/4/15	9/4/15	9/4/15	
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	CONTRO	GROUND	
Rating Unit	%	%	%	%	%	%	%	
Trt Treatment								
No. Name	Rate	Rate	Rate	Rate	Rate	Rate	Rate	
Unit	Unit	Unit	Unit	Unit	Unit	Unit	Unit	
01 Razor Pro	2 qt/a	13.3 a	2.3 a	13.3 a	1.7 d	83.3 a	66.7 a-d	13.3 a
Induce	0.25 % v/v							
02 Esplanade	5 oz/a	10.0 a	0.0 a	23.3 a	6.7 cd	78.3 a	91.3 a	26.7 a
Perspective	8 oz/a							
Oust	3 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
03 Esplanade	5 oz/a	5.0 a	5.0 a	40.0 a	6.7 cd	78.3 a	75.0 abc	45.0 a
Perspective	8 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
04 Esplanade	5 oz/a	1.7 a	2.0 a	6.7 a	6.7 cd	70.0 a	48.3 de	5.0 a
Streamline	8 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
05 Esplanade	5 oz/a	3.3 a	5.0 a	56.7 a	6.7 cd	85.0 a	66.7 a-d	63.3 a
Method 240SL	12 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
06 Esplanade	5 oz/a	4.0 a	0.0 a	35.0 a	3.0 d	86.7 a	63.3 bcd	36.7 a
Viewpoint	12 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
07 Esplanade	5 oz/a	20.0 a	8.3 a	20.0 a	5.7 cd	86.7 a	55.0 cde	20.0 a
Telar	1.5 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
08 Esplanade	5 oz/a	3.3 a	0.0 a	3.3 a	15.7 ab	65.0 a	73.3 a-d	3.3 a
Method 240SL	12 oz/a							
Plateau	8 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
09 Esplanade	5 oz/a	2.3 a	2.3 a	50.0 a	11.7 abc	80.0 a	88.3 ab	55.0 a
Method 240SL	12 oz/a							
Matrix	4 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
10 Esplanade	5 oz/a	5.7 a	2.3 a	43.3 a	11.7 abc	73.3 a	86.7 ab	48.3 a
Matrix	4 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
11 Esplanade	5 oz/a	5.0 a	1.3 a	16.7 a	20.0 a	53.0 a	30.0 e	16.7 a
Hyvar X	3 lb/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							
12 Esplanade	5 oz/a	15.0 a	4.0 a	26.7 a	8.3 bcd	80.0 a	51.7 cde	31.7 a
Opensite	3.3 oz/a							
Razor Pro	2 qt/a							
Induce	0.25 % v/v							

Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

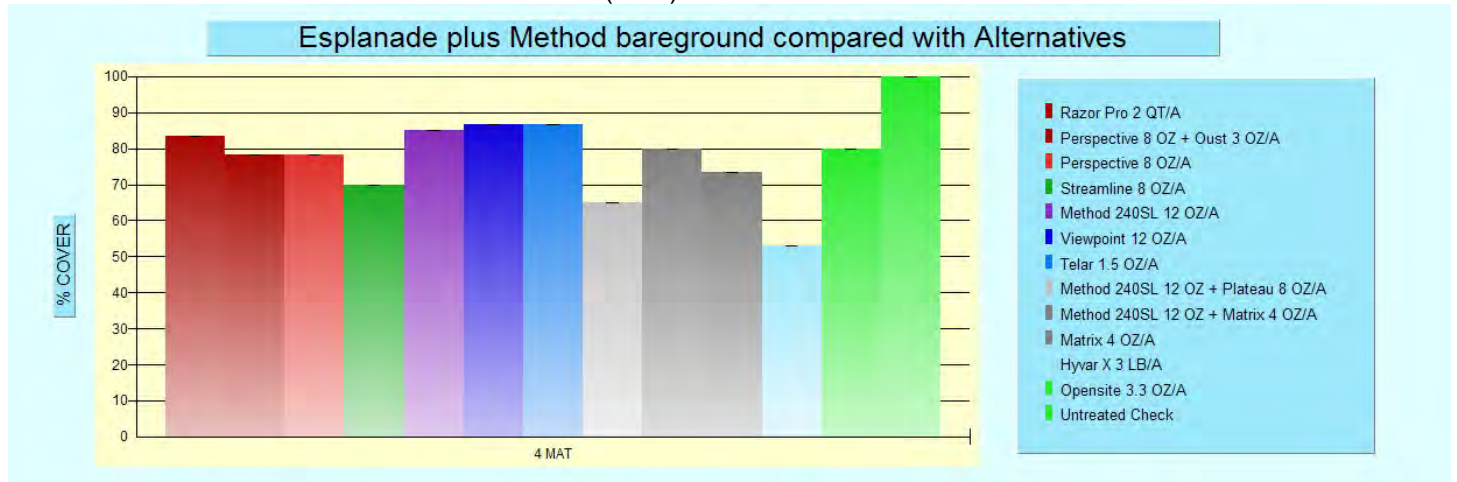
Protocol ID: HE15USADSG
 Location: Brooksville, MS

Trial ID: HE15USADSG
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Trumpetcree>	Toothed spu>	Purple nutg>	Bermuda gra>	Overall Cov>	Johnson gra>	Purple nutg>
Rating Date	8/6/15	8/6/15	8/6/15	8/6/15	9/4/15	9/4/15	9/4/15
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	CONTRO	GROUND
Rating Unit	%	%	%	%	%	%	%
Trt Treatment							
No. Name	22	23	24	25	26	27	28
Rate Unit							
13 Untreated Check	8.3 a	0.0 a	3.3 a	11.7 abc	100.0 a	0.0	3.3 a
LSD (P=Various)	13.31	5.76	51.28	8.63	29.93	26.14	57.18
Standard Deviation	7.90	3.42	30.43	5.12	17.76	15.44	33.93
CV	105.85	136.02	116.92	57.4	22.65	23.27	119.75
Bartlett's X2	19.468	13.272	15.087	9.713	14.066	13.438	19.39
P(Bartlett's X2)	0.078	0.103	0.237	0.641	0.229	0.266	0.08
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	4.709	4.151	0.150	9.561	0.605	4.594	0.117
Replicate Prob(F)	0.0188	0.0283	0.8613	0.0009	0.5543	0.0215	0.8897
Treatment F	1.511	1.615	1.022	2.952	1.266	4.169	1.069
Treatment Prob(F)	0.1879	0.1533	0.4603	0.0116	0.2995	0.0021	0.4255

Means followed by same letter do not differ significantly.

Chart 88. Overall cover 4 months after treatment (MAT).



Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

Protocol ID: HE15USADSG

Trial ID: HE15USADSG

Location: Brooksville, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name		Toothed spu>	Digitaria h>	Nodding spu>	Horsenettle	Overall Cov>	Johnson gra>
Rating Date		9/4/15	9/4/15	9/4/15	9/4/15	5/9/16	5/9/16
Rating Data Type		GROUND	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Unit		%	%	%	%	%	%
Trt	Treatment						
No.	Name	29	30	31	32	33	34
01	Razor Pro Induce	2.3 a	45.0 a	16.7 a	1.7 a	75.0 b	28.3 bc
	Rate						
	Unit						
	2 qt/a						
	0.25 % v/v						
02	Esplanade Perspective Oust Razor Pro Induce	0.0 a	5.0 b	0.0 c	3.3 a	63.3 bc	8.0 d
	Rate						
	Unit						
	5 oz/a						
	8 oz/a						
	3 oz/a						
	2 qt/a						
	0.25 % v/v						
03	Esplanade Perspective Razor Pro Induce	8.3 a	1.7 b	0.0 c	1.7 a	66.7 bc	20.7 bcd
	Rate						
	Unit						
	5 oz/a						
	8 oz/a						
	2 qt/a						
	0.25 % v/v						
04	Esplanade Streamline Razor Pro Induce	1.7 a	1.7 b	0.0 c	3.3 a	73.3 bc	36.7 b
	Rate						
	Unit						
	5 oz/a						
	8 oz/a						
	2 qt/a						
	0.25 % v/v						
05	Esplanade Method 240SL Razor Pro Induce	8.3 a	1.7 b	0.0 c	4.0 a	63.3 bc	13.3 cd
	Rate						
	Unit						
	5 oz/a						
	12 oz/a						
	2 qt/a						
	0.25 % v/v						
06	Esplanade Viewpoint Razor Pro Induce	1.7 a	1.7 b	0.0 c	1.7 a	66.7 bc	18.3 bcd
	Rate						
	Unit						
	5 oz/a						
	12 oz/a						
	2 qt/a						
	0.25 % v/v						
07	Esplanade Telar Razor Pro Induce	11.7 a	0.0 b	1.7 bc	10.0 a	68.3 bc	20.0 bcd
	Rate						
	Unit						
	5 oz/a						
	1.5 oz/a						
	2 qt/a						
	0.25 % v/v						
08	Esplanade Method 240SL Plateau Razor Pro Induce	0.0 a	5.0 b	0.0 c	6.7 a	63.3 bc	14.0 cd
	Rate						
	Unit						
	5 oz/a						
	12 oz/a						
	8 oz/a						
	2 qt/a						
	0.25 % v/v						
09	Esplanade Method 240SL Matrix Razor Pro Induce	5.0 a	3.3 b	6.7 b	5.0 a	60.0 c	5.7 d
	Rate						
	Unit						
	5 oz/a						
	12 oz/a						
	4 oz/a						
	2 qt/a						
	0.25 % v/v						
10	Esplanade Matrix Razor Pro Induce	4.3 a	3.3 b	3.3 bc	7.3 a	61.7 bc	5.7 d
	Rate						
	Unit						
	5 oz/a						
	4 oz/a						
	2 qt/a						
	0.25 % v/v						
11	Esplanade Hyvar X Razor Pro Induce	3.3 a	0.0 b	0.0 c	2.3 a	70.0 bc	56.7 a
	Rate						
	Unit						
	5 oz/a						
	3 lb/a						
	2 qt/a						
	0.25 % v/v						
12	Esplanade Opensite Razor Pro Induce	5.0 a	0.0 b	0.0 c	0.7 a	66.7 bc	36.7 b
	Rate						
	Unit						
	5 oz/a						
	3.3 oz/a						
	2 qt/a						
	0.25 % v/v						

Esplanade plus Method bareground compared with Alternatives - Johnsongrass (Continued)

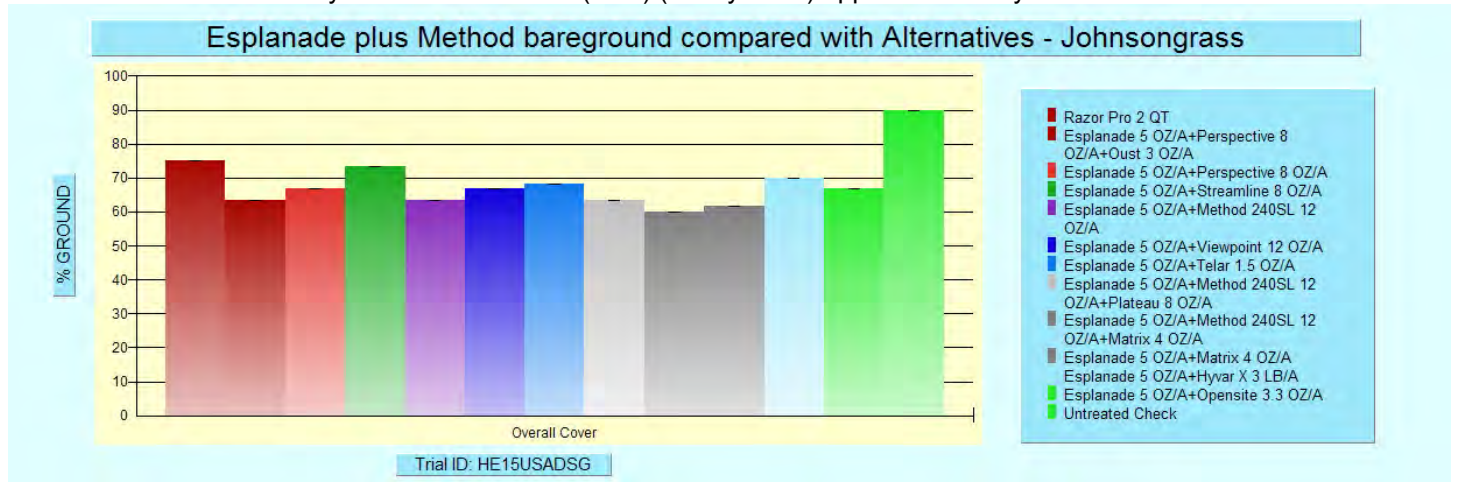
Protocol ID: HE15USADSG
 Location: Brooksville, MS

Trial ID: HE15USADSG
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Toothed spu>	Digitaria h>	Nodding spu>	Horsenettle	Overall Cov>	Johnson gra>
Rating Date	9/4/15	9/4/15	9/4/15	9/4/15	5/9/16	5/9/16
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Unit	%	%	%	%	%	%
Trt Treatment						
No. Name	29	30	31	32	33	34
Rate Unit						
13 Untreated Check	0.0 a	1.7 b	0.0 c	8.3 a	90.0 a	63.3 a
LSD (P=Various)	7.99	16.60	6.44	7.22	14.57	19.82
Standard Deviation	4.74	9.85	3.82	4.28	8.65	11.76
CV	119.22	182.92	175.22	99.44	12.66	46.71
Bartlett's X2	10.425	35.265	7.394	12.459	5.675	20.573
P(Bartlett's X2)	0.236	0.001*	0.06	0.41	0.772	0.057
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	6.158	1.487	0.571	3.823	12.403	7.076
Replicate Prob(F)	0.0069	0.2462	0.5722	0.0362	0.0002	0.0038
Treatment F	1.788	4.469	4.703	1.415	2.470	7.478
Treatment Prob(F)	0.1091	0.0009	0.0006	0.2259	0.0287	0.0001

Means followed by same letter do not differ significantly.

Chart 89. Overall cover 1 year after treatments (YAT) (9 May 2016) applied on 8 May 2015.



Esplanade EZ for Light Industrial Bareground

Protocol ID: HE15USADSQ	Trial ID: HE15USADSQ
Location: Starkville, MS	Study Director: Victor Maddox
	Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Title: _____
Title: _____

Trial Location

City: _____ Starkville _____	Trial Status: _____ Complete _____
State/Prov.: _____ MS _____	Trial Reliability: _____
Postal Code: _____	Initiation Date: _____

Directions:

Mississippi State University Plant Science Research Center in the old Bull Pin area.

Conducted Under GLP:
Conducted Under GEP:

Official Trial Code: _____
Other Trial Code: _____

Results and Conclusions:

Overall cover was at or near 80 percent at the time the study was initiated. Dallisgrass (*Paspalum dilatatum*), bracted plantain (*Plantago aristata*), and white clover (*Trifolium repens*) were most common in plots at this time. Other species included narrowleaf carpetgrass (*Axonopus fissifolius*), common bermudagrass (*Cynodon dactylon*), poorjoe (*Diodia teres*), southern crabgrass (*Digitaria ciliaris*) (not smooth crabgrass), and annual blue-eyed grass (*Sisyrinchium roseolatum*).

Weed Responses

At 29 DAT, 100 percent control of bracted plantain, annual blue-eyed grass, and poorjoe was observed. Control of perennial species was mixed. Esplanade EZ and Prodeuce showed the highest control of dallisgrass, common bermudagrass, and narrowleaf carpetgrass, but not on white clover. Pramitol, Pronto Vegetation Killer, or Knock-Out showed the highest control of white clover at 29 DAT. All treatments, but Razor Pro showed good control of southern crabgrass at 29 DAT. This trend was similar at 60, 90, 120, and 180 DAT.

At 368 DAT, some of the same weeds were observed but differences across treatments were observed indicating residual influence of the treatments the following year. In addition, little hop clover (*Trifolium dubium*) became a dominant species.

Overall Cover

At 29 DAT, overall cover was significantly reduced by all treatments. The lowest cover was observed in plots treated with Esplanade EZ or Prodeuce with 6.3 or 7.5 percent cover, respectively (Chart 90).

At 60 DAT, Pronto Vegetation Killer and Esplanade EZ had the lowest overall cover at 7.5 and 12.5 percent, respectively, but Esplanade EZ was not significantly lower than Knock-Out or Prodeuce (Chart 90). By 90 DAT, overall cover was increasing in all treated plots. Esplanade EZ and Pronto Vegetation Killer had the lowest cover at 80 and 31.3, respectively, but were not significantly lower than Knock-Out. This is in part due to a release in ground spurge and broadleaf signalgrass (*Urochloa platyphylla*) cover (Chart 91). Ground spurge (*Chamaesyce prostrata*) cover was significantly higher (37.5%) in the Prodeuce treated plots, while broadleaf signalgrass cover was highest in the Esplanade EZ (12.5%) and Pronto Vegetation Killer (12.5%) treatments. This pattern remained through 120 DAT (Chart 90).

At 120 DAT, even the lowest cover at 37.5 percent on average (Esplanade EZ) which was significantly lower than all treatments except Pronto Vegetation Killer (40%) (Chart 90). At 180 DAT, overall cover in Esplanade EZ and Prodeuce treated plots was significantly lower than all other treatments, but was unacceptably high at 45 and 43.8 percent cover for bareground treatments. By this date, ground spurge had senesced.

At 368 DAT (1 YAT), overall cover was significantly lower in the Esplanade EZ (55%), Prodeuce (60%) and Pronto Vegetation Killer (60%) treated plots, but not significantly lower than Razor Pro (62.5%) (Chart 92).

Esplanade EZ for Light Industrial Bareground - Continued

Protocol ID: HE15USADSQ
Location: Starkville, MS

Trial ID: HE15USADSQ
Study Director: Victor Maddox
Investigator: John Byrd

Overall Conclusions

Weed response to treatments was variable, with some weed species never receiving 100 percent (bareground) control. Still, cover was very low in the short term, although cover was increasing in all treatments by 90 DAT. Thus, 90 days for the treatments in this study appears to be the suppression/control limit for the weed species on this site. In addition, some species (*Urochloa platyphylla*, etc.) seemed to be released later in the study in certain treatments. This issue may be noteworthy on sites where these species exist in the seed bank with regard to certain treatments.

Site and Design

Plot Width, Unit: 10 FT Site Type: _____
Plot Length, Unit: 20 FT Tillage Type: _____
Replications: 4 Study Design: Randomized Complete Block

Application Description

	A
Application Date:	5/14/15
Time of Day:	12:30 PM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	74 F
% Relative Humidity:	70
Wind Velocity, Unit:	5 MPH
Wind Direction:	E
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	95

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	2 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	80 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Esplanade EZ for Light Industrial Bareground - Continued

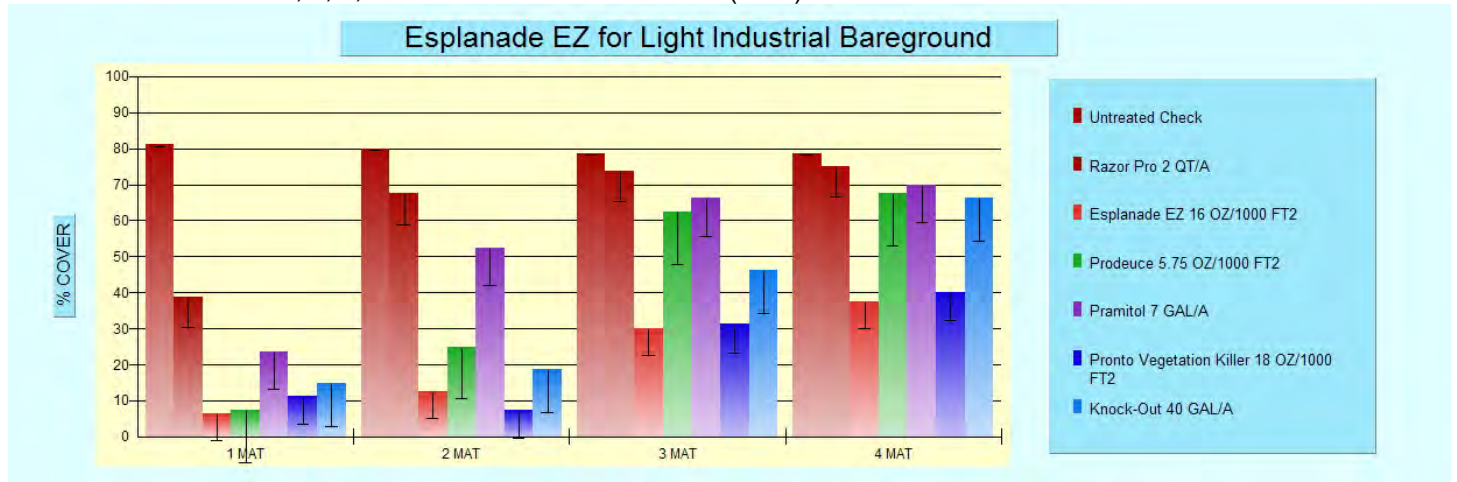
Protocol ID: HE15USADSQ
 Location: Starkville, MS

Trial ID: HE15USADSQ
 Study Director: Victor Maddox
 Investigator: John Byrd

Reps: 4
 Spray vol: 40 gal/ac
 Plots: 10 by 20 feet
 Mix size: 2 liters (min 2.7808)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep			
										1	2	3	4
01	CHK	Untreated Check								101	202	305	401
02	HERB	Razor Pro	480	GA/L	SC	2	qt/a	A	25.0 ml/mx	102	207	306	405
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx				
03	HERB	Esplanade EZ	237.72	GA/L	SL	16	oz/1000 ft2	A	272.3 ml/mx	103	206	302	404
04	HERB	Prodeuce	570	GA/L	SC	5.75	oz/1000 ft2	A	97.84 ml/mx	104	205	304	406
05	HERB	Pramitol	2	LBA/GAL	EC	7	gal/a	A	350.0 ml/mx	105	204	301	407
06	HERB	Pronto Vegetation Killer	43.2	GA/L	SL	18	oz/1000 ft2	A	306.3 ml/mx	106	201	303	402
07	HERB	Knock-Out	18.3	GA/L	EC	40	gal/a	A	1999.8 ml/mx	107	203	307	403

Chart 90. Plot cover at 1, 2, 3, and 4 Months after Treatment (MAT).



Esplanade EZ for Light Industrial Bareground - Continued

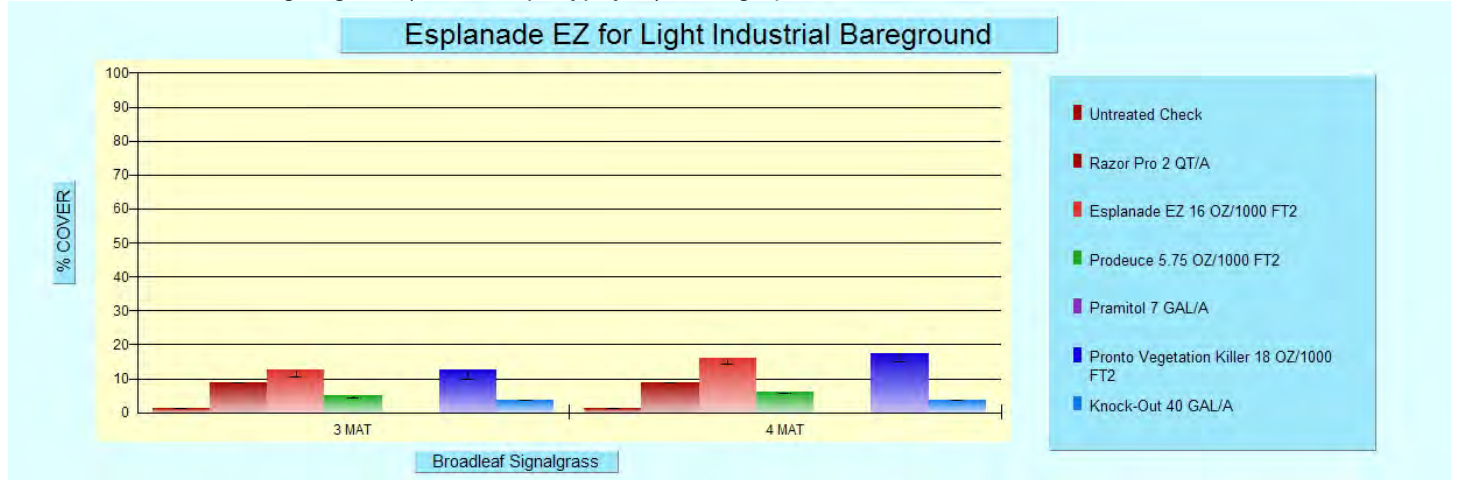
Protocol ID: HE15USADSQ
 Location: Starkville, MS

Trial ID: HE15USADSQ
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Overall 5/14/15 GROUND %AREA	Dallis grass 5/14/15 GROUND %AREA	Bracted pla> 5/14/15 GROUND %AREA	Narrow-leaf> 5/14/15 GROUND %AREA	Bermuda gra> 5/14/15 GROUND %AREA	Poorjoe 5/14/15 GROUND %AREA	Smooth crab> 5/14/15 GROUND %AREA
Trt Treatment							
No. Name	1	2	3	4	5	6	7
01 Untreated Check	80.0	13.8	35.0	3.5	11.3	10.0	11.8
02 Razor Pro NIS	80.0	16.3	31.3	9.3	8.8	6.8	16.3
03 Esplanade EZ	77.5	16.3	26.3	7.3	4.3	4.3	15.0
04 Prodeuce	80.0	15.0	30.0	9.3	10.0	6.8	8.8
05 Pramitol	80.0	13.8	31.3	7.5	10.5	5.5	7.3
06 Pronto Vegetation Killer	80.0	15.0	35.0	3.5	11.3	7.5	7.3
07 Knock-Out	80.0	18.8	33.8	2.8	10.0	6.3	8.5
LSD (P=Various)	2.81	6.05	6.14	5.70	6.47	3.91	7.04
Standard Deviation	1.89	4.07	4.13	3.84	4.35	2.63	4.74
CV	2.37	26.2	13.0	62.45	46.17	39.16	44.4
Bartlett's X2	0.0	5.331	0.684	15.344	3.213	7.175	0.971
P(Bartlett's X2)	.	0.502	0.995	0.018*	0.782	0.305	0.987
Mean Sep. Test							
Replicate F	1.000	3.934	123.419	10.628	12.045	9.768	22.599
Replicate Prob(F)	0.4155	0.0254	0.0001	0.0003	0.0001	0.0005	0.0001
Treatment F	1.000	0.737	2.302	2.168	1.256	1.850	2.457
Treatment Prob(F)	0.4552	0.6270	0.0796	0.0950	0.3253	0.1456	0.0650

Means followed by same letter do not significantly differ.

Chart 91. Broadleaf signalgrass (*Urochloa platyphylla*) average percent cover at 3 and 4 MAT.



Esplanade EZ for Light Industrial Bareground - Continued

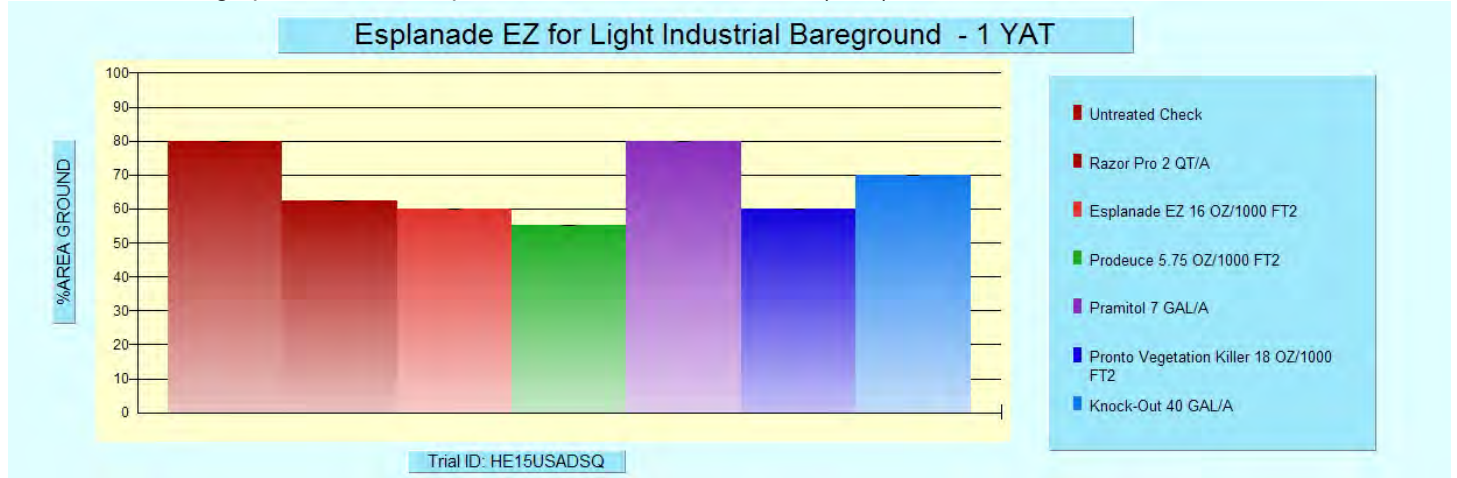
Protocol ID: HE15USADSQ
 Location: Starkville, MS

Trial ID: HE15USADSQ
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Dutch clover	Sisyrinchiu>	Overall	Dallis grass	Bracted pla>	Sisyrinchiu>	Narrow-leaf>
Rating Date	5/14/15	5/14/15	6/12/15	6/12/15	6/12/15	6/12/15	6/12/15
Rating Data Type	GROUND	GROUND	GROUND	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%AREA	%AREA	%AREA	%	%	%	%
Trt Treatment	Rate						
No. Name	Rate Unit	8	9	10	11	12	13
01 Untreated Check		23.8	8.8	81.3 a	0.0	0.0	0.0
02 Razor Pro NIS	2 qt/a 0.25 % v/v	18.8	10.0	38.8 b	85.0 bc	100.0 a	100.0 a
03 Esplanade EZ	16 oz/1000 ft2	16.3	10.0	6.3 d	98.5 ab	100.0 a	100.0 a
04 Prodeuce	5.75 oz/1000 ft2	12.5	10.0	7.5 d	100.0 a	100.0 a	100.0 a
05 Pramitol	7 gal/a	28.8	8.8	23.8 c	10.0 e	100.0 a	100.0 a
06 Pronto Vegetation Killer	18 oz/1000 ft2	25.0	7.5	11.3 cd	82.3 c	100.0 a	100.0 a
07 Knock-Out	40 gal/a	26.3	7.5	15.0 cd	25.0 d	100.0 a	100.0 a
LSD (P=Various)		11.20	2.92	14.57	14.61	0.00	0.00
Standard Deviation		7.54	1.97	9.80	9.70	0.00	0.00
CV		34.89	22.03	37.35	14.52	0.0	0.0
Bartlett's X2		3.598	0.117	22.53	8.143	0.0	0.0
P(Bartlett's X2)		0.731	0.99	0.001*	0.086	.	.
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		13.461	1.538	1.000	1.409	0.000	0.000
Replicate Prob(F)		0.0001	0.2389	0.4155	0.2790	1.0000	1.0000
Treatment F		2.445	1.308	29.755	65.098	0.000	0.000
Treatment Prob(F)		0.0660	0.3036	0.0001	0.0001	1.0000	1.0000

Means followed by same letter do not significantly differ.

Chart 92. Average percent cover of plots at 1 Year after Treatment (YAT).



Esplanade EZ for Light Industrial Bareground - Continued

Protocol ID: HE15USADSQ
Location: Starkville, MS

Trial ID: HE15USADSQ
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		Bermuda gra> 6/12/15	Poorjoe 6/12/15	Crabgrass 6/12/15	Dutch clover 6/12/15	Overall 7/13/15	Dallis grass 7/13/15	Narrow-leaf> 7/13/15
Rating Date		CONTRO	CONTRO	CONTRO	CONTRO	GROUND	CONTRO	CONTRO
Rating Data Type		%	%	%	%	%AREA	%	%
Rating Unit								
Trt Treatment	Rate							
No. Name	Rate Unit	15	16	17	18	19	20	21
01 Untreated Check		0.0	0.0	0.0	0.0	80.0 a	0.0	0.0
02 Razor Pro NIS	2 qt/a 0.25 % v/v	25.0 cd	100.0 a	45.0 b	47.5 c	67.5 ab	80.0 b	32.5 b
03 Esplanade EZ	16 oz/1000 ft2	62.5 a	100.0 a	99.8 a	87.5 ab	12.5 cd	99.8 a	100.0 a
04 Prodeuce	5.75 oz/1000 ft2	60.0 ab	100.0 a	99.5 a	73.8 b	25.0 c	100.0 a	100.0 a
05 Pramitol	7 gal/a	16.3 d	100.0 a	98.5 a	100.0 a	52.5 b	2.5 c	18.8 b
06 Pronto Vegetation Killer	18 oz/1000 ft2	47.5 ab	100.0 a	100.0 a	93.8 a	7.5 d	85.0 ab	97.5 a
07 Knock-Out	40 gal/a	42.5 bc	100.0 a	98.8 a	100.0 a	18.8 cd	7.5 c	82.5 a
LSD (P=Various)		19.64	0.00	16.06	18.73	15.41	15.81	27.96
Standard Deviation		13.04	0.00	10.66	12.43	10.37	10.50	18.56
CV		30.82	0.0	11.81	14.84	27.54	16.8	25.82
Bartlett's X2		6.133	0.0	47.287	3.125	9.639	27.537	13.307
P(Bartlett's X2)		0.293	.	0.001*	0.373	0.141	0.001*	0.004*
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		1.069	0.000	1.270	1.664	0.097	0.903	0.898
Replicate Prob(F)		0.3919	1.0000	0.3205	0.2173	0.9608	0.4627	0.4649
Treatment F		8.127	0.000	17.308	10.651	30.744	74.306	15.621
Treatment Prob(F)		0.0007	1.0000	0.0001	0.0002	0.0001	0.0001	0.0001

Pest Name		Bermuda gra> 7/13/15	Poorjoe 7/13/15	Crabgrass 7/13/15	Dutch clover 7/13/15	Overall 8/12/15	Dallis grass 8/12/15	Narrow-leaf> 8/12/15
Rating Date		CONTRO	CONTRO	CONTRO	CONTRO	GROUND	CONTRO	CONTRO
Rating Data Type		%	%	%	%	%AREA	%	%
Rating Unit								
Trt Treatment	Rate							
No. Name	Rate Unit	22	23	24	25	26	27	28
01 Untreated Check		0.0	0.0	0.0	0.0	78.8 a	0.0	0.0
02 Razor Pro NIS	2 qt/a 0.25 % v/v	20.0 b	97.5 a	7.5 b	80.0 a	73.8 a	75.0 a	25.0 b
03 Esplanade EZ	16 oz/1000 ft2	60.0 a	97.3 a	99.5 a	97.5 a	30.0 c	100.0 a	100.0 a
04 Prodeuce	5.75 oz/1000 ft2	68.8 a	99.5 a	95.0 a	87.3 a	62.5 ab	100.0 a	100.0 a
05 Pramitol	7 gal/a	5.0 b	76.3 b	96.0 a	100.0 a	66.3 a	1.3 b	5.0 b
06 Pronto Vegetation Killer	18 oz/1000 ft2	75.0 a	100.0 a	87.3 a	100.0 a	31.3 c	90.0 a	97.5 a
07 Knock-Out	40 gal/a	18.8 b	100.0 a	95.8 a	100.0 a	46.3 bc	0.0 b	82.5 a
LSD (P=Various)		20.95	16.17	17.85	23.72	19.61	26.69	22.18
Standard Deviation		13.90	10.73	11.85	15.74	13.20	17.71	14.72
CV		33.71	11.29	14.78	16.72	23.77	29.02	21.54
Bartlett's X2		3.349	26.116	28.594	6.281	9.694	11.905	11.311
P(Bartlett's X2)		0.501	0.001*	0.001*	0.043*	0.138	0.003*	0.01*
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		0.754	1.992	1.395	0.818	1.303	0.862	1.692
Replicate Prob(F)		0.5368	0.1585	0.2828	0.5036	0.3041	0.4822	0.2113
Treatment F		18.698	3.009	36.572	1.168	9.034	28.985	33.031
Treatment Prob(F)		0.0001	0.0446	0.0001	0.3698	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ.

Esplanade EZ for Light Industrial Bareground - Continued

Protocol ID: HE15USADSQ
Location: Starkville, MS

Trial ID: HE15USADSQ
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		Bermuda gra>	Poorjoe	Crabgrass	Dutch clover	Ground spur>	Urochloa pl>	Overall
Rating Date		8/12/15	8/12/15	8/12/15	8/12/15	8/12/15	8/12/15	9/11/15
Rating Data Type		CONTRO	CONTRO	CONTRO	CONTRO	GROUND	GROUND	GROUND
Rating Unit		%	%	%	%	%AREA	%AREA	%AREA
Trt Treatment	Rate							
No. Name	Rate Unit	29	30	31	32	33	34	35
01 Untreated Check		0.0	0.0	0.0	0.0	2.5 c	1.3 bc	78.8 a
02 Razor Pro	2 qt/a	10.0 cd	97.5 a	7.5 b	80.0 a	13.8 b	8.8 ab	75.0 a
	0.25 % v/v							
03 Esplanade EZ	16 oz/1000 ft2	30.0 bc	92.5 a	87.5 a	97.5 a	7.5 bc	12.5 a	37.5 b
04 Prodeuce	5.75 oz/1000 ft2	48.8 ab	98.5 a	87.5 a	87.3 a	37.5 a	5.0 abc	67.5 a
05 Pramitol	7 gal/a	0.0 d	67.5 a	87.5 a	100.0 a	0.5 c	0.0 c	70.0 a
06 Pronto Vegetation Killer	18 oz/1000 ft2	72.5 a	95.0 a	81.3 a	100.0 a	1.5 c	12.5 a	40.0 b
07 Knock-Out	40 gal/a	0.0 d	98.8 a	85.0 a	100.0 a	3.0 bc	3.8 bc	66.3 a
LSD (P=Various)		24.11	21.58	20.74	23.72	11.02	8.40	19.43
Standard Deviation		16.00	14.32	13.76	15.74	7.42	5.65	13.08
CV		59.54	15.63	18.93	16.72	78.37	90.43	21.05
Bartlett's X2		6.764	31.379	14.215	6.281	27.824	10.714	18.185
P(Bartlett's X2)		0.08	0.001*	0.014*	0.043*	0.001*	0.057	0.006*
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		2.282	2.004	1.370	0.818	0.543	4.500	0.598
Replicate Prob(F)		0.1208	0.1567	0.2901	0.5036	0.6594	0.0159	0.6244
Treatment F		13.433	2.834	21.682	1.168	12.631	3.261	6.412
Treatment Prob(F)		0.0001	0.0537	0.0001	0.3698	0.0001	0.0238	0.0010

Pest Name		Dallis grass	Narrow-leaf>	Bermuda gra>	Poorjoe	Crabgrass	Ground spur>	Urochloa pl>
Rating Date		9/11/15	9/11/15	9/11/15	9/11/15	9/11/15	9/11/15	9/11/15
Rating Data Type		CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	GROUND	GROUND
Rating Unit		%	%	%	%	%	%AREA	%AREA
Trt Treatment	Rate							
No. Name	Rate Unit	36	37	38	39	40	41	42
01 Untreated Check		0.0	0.0	0.0	0.0	0.0	2.5 b	1.3 c
02 Razor Pro	2 qt/a	75.0 a	25.0 b	10.0 cd	97.5 a	7.5 b	13.8 b	8.8 abc
	0.25 % v/v							
03 Esplanade EZ	16 oz/1000 ft2	100.0 a	100.0 a	30.0 bc	92.0 a	87.5 a	7.5 b	16.3 ab
04 Prodeuce	5.75 oz/1000 ft2	100.0 a	100.0 a	48.8 ab	98.5 a	87.5 a	48.8 a	6.3 bc
05 Pramitol	7 gal/a	1.3 b	5.0 b	0.0 d	65.0 a	87.5 a	1.0 b	0.0 c
06 Pronto Vegetation Killer	18 oz/1000 ft2	90.0 a	97.5 a	72.5 a	94.8 a	81.3 a	2.0 b	17.5 a
07 Knock-Out	40 gal/a	0.0 b	82.5 a	0.0 d	98.8 a	77.5 a	5.3 b	3.8 c
LSD (P=Various)		26.69	22.18	24.11	24.12	24.27	12.88	10.88
Standard Deviation		17.71	14.72	16.00	16.01	16.11	8.67	7.33
CV		29.02	21.54	59.54	17.57	22.54	75.17	95.41
Bartlett's X2		11.905	11.311	6.764	34.932	11.66	30.164	14.367
P(Bartlett's X2)		0.003*	0.01*	0.08	0.001*	0.04*	0.001*	0.013*
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		0.862	1.692	2.282	1.895	0.904	0.632	3.743
Replicate Prob(F)		0.4822	0.2113	0.1208	0.1738	0.4625	0.6036	0.0299
Treatment F		28.985	33.031	13.433	2.653	15.406	15.330	3.588
Treatment Prob(F)		0.0001	0.0001	0.0001	0.0654	0.0001	0.0001	0.0162

Means followed by same letter do not significantly differ.

Esplanade EZ for Light Industrial Bareground - Continued

Protocol ID: HE15USADSQ
Location: Starkville, MS

Trial ID: HE15USADSQ
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name		Overall 11/10/15	Dallis grass 11/10/15	Narrow-leaf> 11/10/15	Bermuda gra> 11/10/15	Poorjoe 11/10/15	Crabgrass 11/10/15	Ground spur> 11/10/15
Rating Date		GROUND	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	GROUND
Rating Data Type		%AREA	%	%	%	%	%	%AREA
Rating Unit								
Trt Treatment	Rate							
No. Name	Rate Unit	43	44	45	46	47	48	49
01 Untreated Check		81.3 a	0.0	0.0	0.0	0.0	0.0	0.0 b
02 Razor Pro NIS	2 qt/a 0.25 % v/v	70.0 a	75.0 a	25.0 b	10.0 b	97.5 a	7.5 b	1.8 b
03 Esplanade EZ	16 oz/1000 ft2	45.0 b	100.0 a	100.0 a	20.0 b	92.0 a	87.5 a	0.5 b
04 Prodeuce	5.75 oz/1000 ft2	43.8 b	100.0 a	100.0 a	47.5 a	98.5 a	87.5 a	6.3 a
05 Pramitol	7 gal/a	75.0 a	0.0 b	5.0 b	0.0 b	62.5 a	87.5 a	0.0 b
06 Pronto Vegetation Killer	18 oz/1000 ft2	65.0 a	90.0 a	97.5 a	72.5 a	94.8 a	81.3 a	0.5 b
07 Knock-Out	40 gal/a	78.8 a	0.0 b	82.5 a	0.0 b	98.8 a	77.5 a	1.3 b
LSD (P=Various)		16.54	26.53	22.18	26.53	26.82	24.27	2.42
Standard Deviation		11.14	17.61	14.72	17.61	17.80	16.11	1.63
CV		16.99	28.94	21.54	70.43	19.63	22.54	111.36
Bartlett's X2		16.576	1.116	11.311	6.595	37.603	11.66	4.369
P(Bartlett's X2)		0.011*	0.291	0.01*	0.086	0.001*	0.04*	0.358
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		1.140	0.914	1.692	0.968	1.815	0.904	1.554
Replicate Prob(F)		0.3597	0.4577	0.2113	0.4337	0.1878	0.4625	0.2352
Treatment F		7.675	29.731	33.031	11.000	2.489	15.406	7.316
Treatment Prob(F)		0.0003	0.0001	0.0001	0.0001	0.0784	0.0001	0.0004

Pest Name		Urochloa pl> 11/10/15	Little quak> 5/16/16	Small hop c> 5/16/16	Dallis grass 5/16/16	Sisyrinchiu> 5/16/16	Bermuda gra> 5/16/16	Brazil verv> 5/16/16
Rating Date		GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Data Type		%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA
Rating Unit								
Trt Treatment	Rate							
No. Name	Rate Unit	50	51	52	53	54	55	56
01 Untreated Check		1.3 c	7.5 a	15.0 a	11.3 bc	7.5 b	7.5 b	13.8 a
02 Razor Pro NIS	2 qt/a 0.25 % v/v	8.8 abc	5.5 ab	10.0 a	2.8 c	10.0 b	10.0 b	7.5 b
03 Esplanade EZ	16 oz/1000 ft2	16.3 ab	4.0 b	5.3 a	0.8 c	27.5 a	21.3 a	0.0 c
04 Prodeuce	5.75 oz/1000 ft2	6.3 bc	3.5 b	12.5 a	0.5 c	11.3 b	7.5 b	0.5 c
05 Pramitol	7 gal/a	0.0 c	3.5 b	12.5 a	27.5 a	5.0 b	8.8 b	0.0 c
06 Pronto Vegetation Killer	18 oz/1000 ft2	17.5 a	7.5 a	17.5 a	0.0 c	5.0 b	5.8 b	0.3 c
07 Knock-Out	40 gal/a	3.8 c	7.8 a	13.8 a	18.8 ab	5.0 b	21.3 a	0.5 c
LSD (P=Various)		10.88	3.30	8.28	13.17	6.50	10.69	4.56
Standard Deviation		7.33	2.22	5.57	8.87	4.38	7.20	3.07
CV		95.41	39.67	45.11	100.91	42.99	61.42	95.55
Bartlett's X2		14.367	5.668	1.827	36.887	2.184	12.767	25.781
P(Bartlett's X2)		0.013*	0.461	0.935	0.001*	0.535	0.047*	0.001*
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		3.743	9.207	1.344	1.392	0.420	2.905	1.015
Replicate Prob(F)		0.0299	0.0007	0.2914	0.2776	0.7411	0.0631	0.4092
Treatment F		3.588	3.130	1.963	5.958	13.539	3.408	12.266
Treatment Prob(F)		0.0162	0.0279	0.1250	0.0014	0.0001	0.0200	0.0001

Means followed by same letter do not significantly differ.

Esplanade EZ for Light Industrial Bareground - Continued

Protocol ID: HE15USADSQ
Location: Starkville, MS

Trial ID: HE15USADSQ
Study Director: Victor Maddox
Investigator: John Byrd

Pest Name	Bracted pla>	Poorjoe	Red sorrel	Crabgrass	Narrow-leaf>	Overall	conyza cana>	
Rating Date	5/16/16	5/16/16	5/16/16	5/16/16	5/16/16	5/16/16	5/16/16	
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	
Trt Treatment	Rate							
No. Name	Rate Unit	57	58	59	60	61	62	63
01 Untreated Check		15.0 a	5.5 a	1.8 a	5.0 b	5.0 b	80.0 a	1.8 b
02 Razor Pro NIS	2 qt/a 0.25 % v/v	4.5 b	2.5 a	2.8 a	12.5 a	1.8 c	62.5 bc	1.8 b
03 Esplanade EZ	16 oz/1000 ft2	0.3 b	6.5 a	7.5 a	5.0 b	0.5 c	60.0 c	2.3 b
04 Prodeuce	5.75 oz/1000 ft2	1.0 b	2.8 a	2.8 a	2.0 b	0.0 c	55.0 c	5.5 a
05 Pramitol	7 gal/a	1.8 b	11.3 a	3.8 a	2.5 b	10.0 a	80.0 a	0.3 b
06 Pronto Vegetation Killer	18 oz/1000 ft2	2.3 b	5.0 a	7.8 a	5.0 b	0.0 c	60.0 c	2.3 b
07 Knock-Out	40 gal/a	1.8 b	0.5 a	3.8 a	3.8 b	1.3 c	70.0 b	0.3 b
LSD (P=Various)		5.84	7.46	4.40	4.85	3.19	7.89	3.17
Standard Deviation		3.93	5.02	2.96	3.27	2.15	5.31	2.13
CV		103.78	103.37	69.08	63.96	81.22	7.95	106.58
Bartlett's X2		25.247	22.612	5.781	10.677	5.394	1.114	17.847
P(Bartlett's X2)		0.001*	0.001*	0.448	0.058	0.249	0.892	0.007*
Mean Sep. Test		LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F		2.681	6.607	10.332	0.958	4.021	3.169	4.528
Replicate Prob(F)		0.0778	0.0033	0.0004	0.4337	0.0236	0.0496	0.0156
Treatment F		6.788	1.930	2.590	4.560	11.718	14.408	2.733
Treatment Prob(F)		0.0007	0.1307	0.0548	0.0056	0.0001	0.0001	0.0457

Means followed by same letter do not significantly differ.

Efficacy of Vastlan Side-Trim on Eastern Redcedar

Protocol ID: _____ Trial ID: _____
 Location: _____ Study Director: Victor Maddox
 Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox Title: _____
 Investigator: John Byrd Title: _____

Trial Location

City: Mayhew Trial Status: _____
 State/Prov.: MS Trial Reliability: _____

Directions:

Southwest Corner of Hwy 45/Hwy 183 Junction along drainage.

Conducted Under GLP: Official Trial Code: _____
 Conducted Under GEP: Other Trial Code: _____

Results and Discussion

Eastern Red Cedar Response

Control of Eastern red cedar (*Juniperus virginiana*) with triclopyr in this study was minimal. No significant differences were observed between treatments on any date and control ranged from 5% 1 MAT, 6.7% 2 MAT and 3% 3 MAT. No control was observed at 1 YAT.

Overall Conclusions

The 24 oz ae/A rate is not an acceptable rate for these triclopyr products on Eastern red cedar, but the two products performed similar.

Site and Design

Plot Width, Unit: 10 FT Site Type: _____
 Plot Length, Unit: 30 FT Tillage Type: _____
 Replications: 3 Study Design: Randomized Complete Block

Application Description

	A
Application Date:	5/4/15
Time of Day:	1:45 PM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	82 F
% Relative Humidity:	50
Wind Velocity, Unit:	5 MPH
Wind Direction:	E
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	40

Efficacy of Vastlan Side-Trim on Eastern Redcedar (Continued)

Protocol ID:	Trial ID:
Location:	Study Director: Victor Maddox
	Investigator: John Byrd

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Equipment Comment: Boom turned upon side (perpendicular to grade) to conduct side trim.

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Triclopyr HL	4	LBAE/GAL	SL	24	oz ae/a	A	30.0 ml/mx	101	203	301
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	Garlon 3A	3	LBAE/GAL	SC	24	oz ae/a	A	40.0 ml/mx	102	201	302
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	CHK	Untreated Check								103	202	303

Pest Name	Eastern red>	Eastern red>	Eastern red>	Eastern red>	Eastern red>
Rating Date	5/4/15	6/3/15	7/3/15	8/3/15	5/3/16
Rating Data Type	GROUND	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%AREA	%	%	%	%
Trt No.	Treatment Name	Rate	Rate	Rate	Rate
		Unit	Unit	Unit	Unit
		1	2	3	4
		5			
1	Triclopyr HL	24 oz ae/a	95.0	5.0 a	6.7 a
	NIS	0.25 % v/v			
2	Garlon 3A	24 oz ae/a	95.0	5.0 a	6.7 a
	NIS	0.25 % v/v			
3	Untreated Check		95.0	0.0	0.0
	LSD (P=Various)		0.00	0.00	12.42
	Standard Deviation		0.00	0.00	3.54
	CV		0.0	0.0	53.03
	Bartlett's X2		0.0	0.0	70.71
	P(Bartlett's X2)		.	.	0.0
	Mean Sep. Test			LSD.05	1.00
				LSD.05	LSD.05
	Replicate F		0.000	0.000	0.333
	Replicate Prob(F)		1.0000	1.0000	0.7500
	Treatment F		0.000	0.000	0.7500
	Treatment Prob(F)		1.0000	1.0000	0.000
					1.0000

Means followed by same letter do not differ significantly.

Efficacy of Vastlan Side-Trim on Chinese Privet

Protocol ID: _____ Trial ID: _____
 Location: Meridian, MS Study Director: Victor Maddox
 Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox **Title:** _____
Affiliation: MSU
Investigator: John Byrd **Title:** _____

Trial Location

City: Meridian **Trial Status:** _____
State/Prov.: MS **Trial Reliability:** _____
Directions:
 East side of Hwy 45 approximately 2 miles north of Marion, MS.

Conducted Under GLP: **Official Trial Code:** _____
Conducted Under GEP: **Other Trial Code:** _____

Results and Discussion

Chinese privet (*Ligustrum sinense*) vertical cover ranged from 76.7 to 90% at 0 DAT. Treatments were foliar applied to mature plants. Ratings on Japanese honeysuckle (*Lonicera japonica*), kudzu (*Pueraria montana*), and trumpet creeper (*Campsis radicans*), but cover on these three species was not uniform over the study and thus only briefly mentioned in these results.

Chinese Privet Response

At 30 DAT, control/burndown ranged 93.3 to 100% and product differences were not significant. By 60 DAT, control had diminished. This was due to regrowth in all treated plots. By 91 DAT, control diminished to 81.7 and 70%, but was not significantly different. At 1 YAT, control was still observed, but was only around 50%.

Other Woody Species

Both products had activity on Japanese honeysuckle, kudzu, and trumpet creeper, but more research is needed on the efficacy of these products.

Overall Conclusions

Both products were effective in burning back Chinese privet foliage in the study. However, the observance of regrowth at 60 DAT indicates that plants were not killed at the foliar rates used in this study and retreatment will be needed at some point in the future.

Site and Design

Plot Width, Unit: 10 FT **Site Type:** _____
Plot Length, Unit: 30 FT **Tillage Type:** _____
Replications: 3 **Study Design:** Randomized Complete Block

Application Description

	A
Application Date:	5/4/15
Time of Day:	3:45 PM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	86 F
% Relative Humidity:	50
Wind Velocity, Unit:	4 MPH
Wind Direction:	E
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	40

Efficacy of Vastlan Side-Trim on Chinese Privet (Continued)

Protocol ID:

Trial ID:

Location: Meridian, MS

Study Director: Victor Maddox

Investigator: John Byrd

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Equipment Comment: Boom turned upon side (perpendicular to grade) to conduct side trim.

Reps: 3

Plots: 10 by 30 feet

Spray vol: 25 gal/ac

Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Triclopyr HL	4	LBAE/GAL	SL	24	oz ae/a	A	30.0 ml/mx	101	203	301
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	Garlon 3A	3	LBAE/GAL	SC	24	oz ae/a	A	40.0 ml/mx	102	201	302
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	CHK	Untreated Check								103	202	303

Efficacy of Vastlan Side-Trim on Chinese Privet (Continued)

Protocol ID:

Trial ID:

Location: Meridian, MS

Study Director: Victor Maddox

Investigator: John Byrd

Pest Name	Chinese pri>	Pueraria mo>	Chinese pri>	Pueraria mo>	Chinese pri>	Pueraria mo>	Chinese pri>		
Rating Date	5/4/15	5/4/15	6/3/15	6/3/15	7/3/15	7/3/15	8/3/15		
Rating Data Type	GROUND	GROUND	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO		
Rating Unit	%AREA	%AREA	%	%	%	%	%		
Trt Treatment	Rate	Rate	Rate	Rate	Rate	Rate	Rate		
No. Name	Rate	Unit	1	2	3	4	5	6	7
1 Triclopyr HL NIS	24 oz ae/a 0.25 % v/v		76.7	13.3	100.0 a	90.0	95.0 a	90.0	81.7 a
2 Garlon 3A NIS	24 oz ae/a 0.25 % v/v		76.7	21.7	93.3 a	63.3	91.7 a	63.3	70.0 a
3 Untreated Check			90.0	11.7	0.0	0.0	0.0	0.0	0.0
LSD (P=Various)			17.72	22.51	14.34	.	7.17	.	31.26
Standard Deviation			7.82	9.93	4.08	.	2.04	.	8.90
CV			9.64	63.84	4.22	.	2.19	.	11.73
Bartlett's X2			1.5	2.122	0.0	.	0.0	.	2.238
P(Bartlett's X2)			0.472	0.346	.	.	.	.	0.135
Mean Sep. Test					LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			11.773	10.169	1.000		1.000		0.368
Replicate Prob(F)			0.0211	0.0270	0.5000		0.5000		0.7308
Treatment F			2.909	0.873	4.000		4.000		2.579
Treatment Prob(F)			0.1660	0.4845	0.1835		0.1835		0.2495

Pest Name	Pueraria mo>	Chinese pri>	Pueraria mo>		
Rating Date	8/3/15	5/3/16	5/3/16		
Rating Data Type	CONTRO	CONTRO	CONTRO		
Rating Unit	%	%	%		
Trt Treatment	Rate	Rate	Rate		
No. Name	Rate	Unit	8	9	10
1 Triclopyr HL NIS	24 oz ae/a 0.25 % v/v		80.0	53.3 a	10.0
2 Garlon 3A NIS	24 oz ae/a 0.25 % v/v		50.0	46.7 a	6.7
3 Untreated Check			0.0	0.0	0.0
LSD (P=Various)			.	37.95	.
Standard Deviation			.	10.80	.
CV			.	21.6	.
Bartlett's X2			.	0.793	.
P(Bartlett's X2)			.	0.373	.
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F				0.429	
Replicate Prob(F)				0.7000	
Treatment F				0.571	
Treatment Prob(F)				0.5286	

Means followed by same letter do not differ significantly.

Efficacy of Vastlan Side-Trim on Black Willow

Protocol ID:	Trial ID:
Location: Artesia, MS	Study Director: Victor Maddox
	Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox	Title: _____
Investigator: John Byrd	Title: _____
Trial Location	
City: Artesia	Trial Status: _____
State/Prov.: MS	Trial Reliability: _____
Directions:	
East side of Hwy 45 along drainage just north of intersection with Sessum Road.	
Conducted Under GLP: <input type="checkbox"/>	Official Trial Code: _____
Conducted Under GEP: <input checked="" type="checkbox"/>	Other Trial Code: _____

Results and Discussion

Black willow (*Salix nigra*) vertical cover ranged from 50 to 53.3% on average at 0 DAT. Products were applied to foliage on trees with 3 to 6 inch diameter. By 30 DAT, 100 percent control/burndown was observed in all plots by both products. Regrowth was observed at 60 DAT, and control has diminished to 91.7 and 90%. This pattern continued with 66.7 and 53.3% control at 91 DAT and 40 and 33.3% control at 1 YAT.

Overall Conclusions

The early response to both products was good. However, main stems were not killed and regrowth was observed at 60 DAT. Retreatment would be required at some point in the future under the rates and conditions in this study.

Site and Design

Plot Width, Unit: 10	FT	Site Type: _____
Plot Length, Unit: 30	FT	Tillage Type: _____
Replications: 3		Study Design: Randomized Complete Block

Efficacy of Vastlan Side-Trim on Black Willow (Continued)

Protocol ID:	Trial ID:
Location: Artesia, MS	Study Director: Victor Maddox
	Investigator: John Byrd

Application Description

	A
Application Date:	5/4/15
Time of Day:	2:30 PM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	85 F
% Relative Humidity:	50
Wind Velocity, Unit:	6 MPH
Wind Direction:	E
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	40

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 Liters
Tank Mix (Y/N):	Y

Equipment Comment: Boom turned upon side (perpendicular to grade) to conduct side trim.

Efficacy of Vastlan Side-Trim on Black Willow (Continued)

Protocol ID:	Trial ID:
Location: Artesia, MS	Study Director: Victor Maddox
	Investigator: John Byrd

Reps: 3 Plots: 10 by 30 feet
Spray vol: 25 gal/ac Mix size: 2 liters (min 1.9553)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
1	HERB	Triclopyr HL	4	LBAE/GAL	SL	24	oz ae/a	A	30.0 ml/mx	101	203	301
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
2	HERB	Garlon 3A	3	LBAE/GAL	SC	24	oz ae/a	A	40.0 ml/mx	102	201	302
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
3	CHK	Untreated Check						A		103	202	303

Pest Name	Black willow	Black willow	Black willow	Black willow	Black willow							
Rating Date	5/4/15	6/3/15	7/3/15	8/3/15	5/3/16							
Rating Data Type	GROUND	CONTRO	CONTRO	CONTRO	CONTRO							
Rating Unit	%AREA	%	%	%	%							
Trt No.	Treatment Name	Rate Rate	Rate Unit	1	2	3	4	5				
1	Triclopyr HL	24	oz ae/a	53.3	100.0	a	91.7	a	66.7	a	40.0	a
	NIS	0.25	% v/v									
2	Garlon 3A	24	oz ae/a	50.0	100.0	a	90.0	a	53.3	a	33.3	a
	NIS	0.25	% v/v									
3	Untreated Check			50.0	0.0		0.0		0.0		0.0	
LSD (P=Various)				28.77	0.00		7.17		14.34		51.72	
Standard Deviation				12.69	0.00		2.04		4.08		14.72	
CV				24.83	0.0		2.25		6.8		40.14	
Bartlett's X2				0.049	0.0		0.0		0.793		2.238	
P(Bartlett's X2)				0.976	.		.		0.373		0.135	
Mean Sep. Test					LSD.05		LSD.05		LSD.05		LSD.05	
Replicate F				0.069	0.000		1.000		9.000		1.000	
Replicate Prob(F)				0.9344	1.0000		0.5000		0.1000		0.5000	
Treatment F				0.069	0.000		1.000		16.000		0.308	
Treatment Prob(F)				0.9344	1.0000		0.4226		0.0572		0.6349	

Means followed by same letter do not differ significantly.

Vastlan Side-Trim with MS-DOT

Protocol ID: NA15L1A001
Location: Meridian

Trial ID: NA15L1A001
Study Director: Victor Maddox
Investigator: John Byrd

General Trial Information

Study Director: Victor Maddox
Investigator: John Byrd

Title: _____
Title: _____

Trial Location

City: Meridian
State/Prov.: MS

Trial Status: _____
Trial Reliability: _____

Directions:

East side of Hwy 45 approximately 2 mile north of Marion, MS.

Conducted Under GLP: _
Conducted Under GEP: X

Official Trial Code: _____
Other Trial Code: _____

Results and Discussion

At 0 DAT, vertical Chinese privet cover ranged from 56.7 to 70% on average. Plants were mature at the time of application with stems ranging from 2 to 4 inches in diameter. Other woody species were present at the time of application and included common elderberry (*Sambucus nigra*), Japanese honeysuckle (*Lonicera japonica*), muscadine grape (*Vitis rotundifolia*), sweetgum (*Liquidambar styraciflua*), and trumpet creeper (*Campsis radicans*) but cover was not consistent across the study and control ratings not recorded.

By 30 DAT, Chinese privet response all products was good, ranging from 97.7 to 99% control/burndown, and no significance differences were observed. By 61 DAT, control was diminished due to regrowth in all treatments except the Vastlan plus Milestone plus Vista XRT treatment. By 90 DAT, this 3-way mix had only diminished to 98% from 99%, but differences were still not significant. By 1 YAT, control ranged from 60 to 70% and differences were still not significant (Chart 93).

Overall Conclusions

Based upon the results of this study, all products performed similarly on Chinese privet. Despite slower regrowth with a 3-way mix, this treatment did not significantly outperform other treatments. The reduced control at from 60 DAT to 1 YAT indicates retreatment would be required at some point under the rates and conditions in this study. However, all treatments remained above 90% burndown through 91 DAT.

Site and Design

Plot Width, Unit: 10 FT
Plot Length, Unit: 20 FT
Replications: 3

Site Type: _____
Tillage Type: _____
Study Design: Randomized Complete Block

Vastlan Side-Trim with MS-DOT (Continued)

Protocol ID: NA15L1A001
Location: Meridian

Trial ID: NA15L1A001
Study Director: Victor Maddox
Investigator: John Byrd

Application Description

	A
Application Date:	5/13/15
Time of Day:	11:45 AM
Application Method:	SPRAY
Application Timing:	POSPOS
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	80 F
% Relative Humidity:	50
Wind Velocity, Unit:	4 MPH
Wind Direction:	S
Dew Presence (Y/N):	N
Soil Moisture:	ADEQUATE
% Cloud Cover:	50

Application Equipment

	A
Appl. Equipment:	CO2 Backpack
Operating Pressure, Unit:	20 PSI
Nozzle Type:	Flat Fan
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	Water
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2
Tank Mix (Y/N):	Y

Equipment Comment: Boom turned up on side to apply side-trim application.

Vastlan Side-Trim with MS-DOT (Continued)

Protocol ID: NA15L1A001
Location: Meridian

Trial ID: NA15L1A001
Study Director: Victor Maddox
Investigator: John Byrd

Reps: 3
Spray vol: 25 gal/ac

Plots: 10 by 20 feet
Mix size: 2 liters (min 1.3035)

Trt No.	Treatment Type	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Amt Product to Measure	Plot No. By Rep		
										1	2	3
01	HERB	Capstone	1.1	LBAE/GAL	SL	8	pt/a	A	79.99 ml/mx	101	203	305
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
02	HERB	Capstone	1.1	LBAE/GAL	SL	8	pt/a	A	79.99 ml/mx	102	204	301
	HERB	Vista XRT	2.78	LBAE/GAL	EC	10	fl oz/a	A	6.25 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
03	HERB	Vastlan	4	LBAE/GAL	SL	2	pt/a	A	20.0 ml/mx	103	201	302
	HERB	Milestone	2	LB/GAL	SL	7	fl oz/a	A	4.375 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
04	HERB	Vastlan	4	LBAE/GAL	SL	2	pt/a	A	20.0 ml/mx	104	205	304
	HERB	Milestone	2	LB/GAL	SL	7	fl oz/a	A	4.375 ml/mx			
	HERB	Vista XRT	2.78	LBAE/GAL	EC	10	fl oz/a	A	6.25 ml/mx			
	ADJ	NIS	100	%	SL	0.25	% v/v	A	4.999 ml/mx			
05	CHK	Untreated Check						A		105	202	303

Pest Name	Chinese pri>	Common elder	Japanese ho>	Box elder	Muscadine g>	Trumpetree>	Sweetgum			
Rating Date	5/13/15	5/13/15	5/13/15	5/13/15	5/13/15	5/13/15	5/13/15			
Rating Data Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA			
Trt No.	Treatment Name	Rate	Unit	1	2	3	4	5	6	7
01	Capstone	8	pt/a	70.0	5.0	5.0	3.3	1.7	11.7	6.7
	NIS	0.25	% v/v							
02	Capstone	8	pt/a	65.0	0.0	6.7	0.0	0.0	13.3	1.7
	Vista XRT	10	fl oz/a							
	NIS	0.25	% v/v							
03	Vastlan	2	pt/a	66.7	0.0	10.0	10.0	0.0	15.0	0.0
	Milestone	7	fl oz/a							
	NIS	0.25	% v/v							
04	Vastlan	2	pt/a	70.0	0.0	0.0	0.0	0.0	10.0	5.0
	Milestone	7	fl oz/a							
	Vista XRT	10	fl oz/a							
	NIS	0.25	% v/v							
05	Untreated Check			56.7	0.0	6.7	3.3	8.3	16.7	20.0
LSD (P=Various)				12.98	7.29	21.26	17.36	11.78	19.14	25.78
Standard Deviation				6.89	3.87	11.29	9.22	6.26	10.17	13.69
CV				10.5	387.3	199.26	276.59	312.92	76.24	205.4
Bartlett's X2				0.832	0.0	2.272	3.124	3.64	2.149	8.993
P(Bartlett's X2)				0.842	.	0.518	0.21	0.056	0.708	0.029*
Mean Sep. Test										
Replicate F				3.193	1.000	0.641	0.314	1.532	3.984	3.556
Replicate Prob(F)				0.0956	0.4096	0.5520	0.7393	0.2734	0.0630	0.0786
Treatment F				1.895	1.000	0.314	0.588	1.000	0.202	1.000
Treatment Prob(F)				0.2048	0.4609	0.8611	0.6807	0.4609	0.9305	0.4609

Means followed by same letter do not differ significantly.

Vastlan Side-Trim with MS-DOT (Continued)

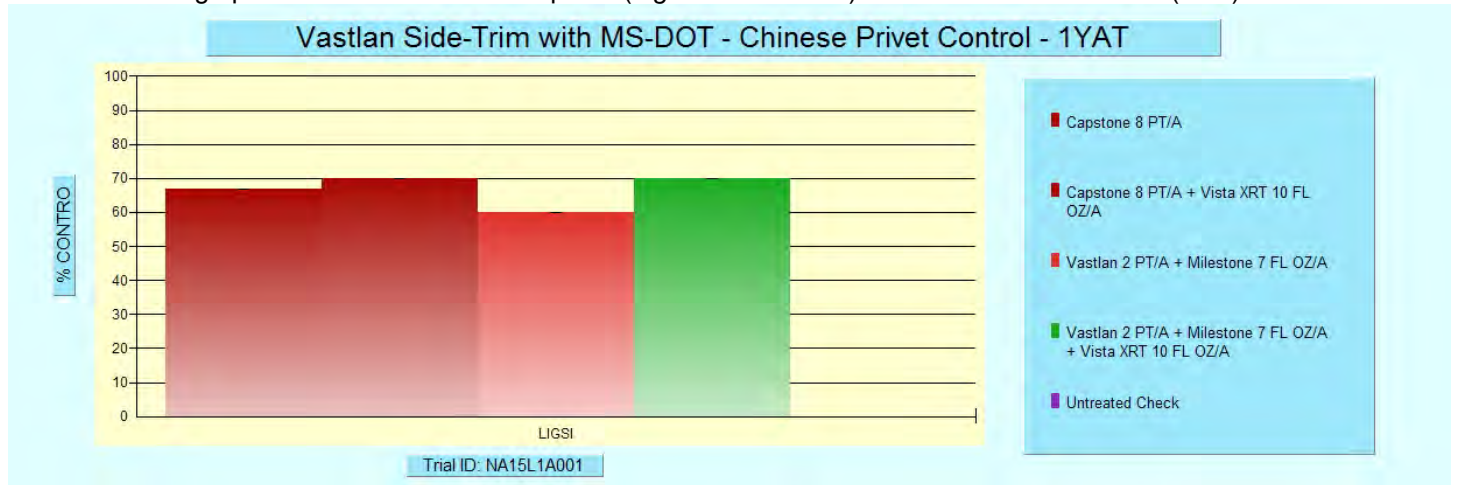
Protocol ID: NA15L1A001
 Location: Meridian

Trial ID: NA15L1A001
 Study Director: Victor Maddox
 Investigator: John Byrd

Pest Name	Chinese pri> 6/12/15	Chinese pri> 7/13/15	Chinese pri> 8/12/15	Chinese pri> 5/16/16
Rating Date	CONTRO	CONTRO	CONTRO	CONTRO
Rating Data Type				
Rating Unit	%	%	%	%
Trt Treatment				
No. Name	8	9	10	11
01 Capstone NIS	97.7 a	94.7 a	91.3 a	66.7 a
02 Capstone Vista XRT NIS	99.0 a	97.7 a	93.3 a	70.0 a
03 Vastlan Milestone NIS	98.3 a	95.0 a	91.3 a	60.0 a
04 Vastlan Milestone Vista XRT NIS	99.0 a	99.0 a	98.0 a	70.0 a
05 Untreated Check	0.0	0.0	0.0	0.0
LSD (P=Various)	3.90	7.57	10.49	17.30
Standard Deviation	1.95	3.79	5.25	8.66
CV	1.98	3.92	5.62	12.99
Bartlett's X2	1.74	4.028	2.708	0.639
P(Bartlett's X2)	0.419	0.258	0.439	0.887
Mean Sep. Test	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	0.854	0.598	1.205	1.444
Replicate Prob(F)	0.4717	0.5798	0.3630	0.3075
Treatment F	0.321	0.919	1.076	0.889
Treatment Prob(F)	0.8104	0.4864	0.4275	0.4987

Means followed by same letter do not differ significantly.

Chart 93. Average percent control of Chinese privet (*Ligustrum sinense*) at 1 Year after Treatment (YAT).



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF

General Trial Information

VUSA2015PIPERPR04.03 Location:Gibson Trial Year:2015
 Protocol ID:VUSA2015PIPERPR04.03 Investigator:Victor Maddox
 Project ID:4600.39924 Study Director:VMaddox
 Sponsor Contact:Frank Carey/Joe Chamberlain

Trial Location

City:Gibson **Country:** USA United States
State/Prov.:Mississippi

Latitude of LL Corner °:33.81227 N
Longitude of LL Corner °:88.70251 W
Altitude of LL Corner, 290.00 FT
Unit:

Directions:

West side of Hwy 45, approximately one mile south of the Gibson Exit.

Conducted Under
GLP: Yes

Conducted Under
GEP: No

Study Rules:Default

No.	Guideline	Description
1.	ADM-C-PU B	Confidentiality - Public Trial - No Secrecy Agreement Required

Site and Design

Treated Plot Width: 6 FT
Treated Plot Length: 30 FT
Treated Plot Area: 180 FT² **Treatments:** 11

Replications: 4

Study Design: RACOBL Randomized Complete Block (RCB)
 :

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Objectives:

Evaluate Piper in unimproved roadside turf settings in SE US; to determine efficacy for control of Italian ryegrass and other winter annual weeds when applied at two different timings; and to evaluate turf tolerance.

Results and Discussion: Application A (December 4, 2015)

Application A Overview. At 0 DAT, overall cover was 80 percent. Bahiagrass (*Paspalum notatum*) and bermudagrass (*Cynodon dactylon*) cover ranged from 18 to 30% and 47.5 to 55%, respectively, and were the dominant turfgrass species. Tall fescue (*Schedonorus arundinaceus*) was present, but not a dominant turf. Other species present included annual ryegrass (*Lolium multiflorum*), buckhorn plantain (*Plantago lanceolata*), hairy vetch (*Vicia villosa*), and Venus's comb (*Scandix pecten-veneris*).

Turf Response to Piper

Bahiagrass. In the spring of 2016 (119 DAT), significant discoloration of bahiagrass was observed (Chart 94) and remained through 150 DAT. Discoloration was not significant at 180 DAT and not observed at 210 DAT. Discoloration was most pronounced in treatments with glyphosate with a rating of 2 at 119 DAT. Very little discoloration was observed in treatments with Piper alone at either rate. Bahiagrass cover was not significantly different at 119 DAT during the study (Chart 95), but reductions in cover was observed in treatments receiving glyphosate through 210 DAT. This illustrates the potential long-term damage that's possibly even at low rates of glyphosate (18 fl oz/A) under the conditions in this study.

Bermudagrass. No discoloration was observed on bermudagrass. There were no significant differences in bermudagrass cover at 180 or 210 DAT during the study (Chart 96). Interestingly, bermudagrass cover was higher in treatments receiving glyphosate. This is likely a release from other species, like bahiagrass that was damaged from glyphosate treatments. Thus, a mixture of turfgrass species may have more resiliency to herbicide injury.

Tall Fescue. At 7 DAT tall fescue was significantly discolored (Chart 97), particularly in treatments receiving glyphosate which had a rating of 3.5. This rating was reduced to 2 by 31 DAT, with only slight discoloration observed in other herbicide treatments. This was also reflected in control (damage), which was 82.5 and 77.5% on average in treatments receiving glyphosate at 31 DAT (Chart 98). By 60 DAT, damage was up to 95 and 92.5% in treatments receiving glyphosate. Damage was significantly less in treatments receiving Piper alone at either rate. This pattern remained through 150 DAT. This again illustrates the potential long-term damage that's possible even at low rates of glyphosate (18 fl oz/A) under the conditions in this study.

Overall Cover Response to Piper

Overall cover was significantly reduced in all treatments by 7 DAT (Chart 99). This is expected due to control of weed species or turf damage by herbicide applications in the study. At 31 DAT, cover in treatments receiving glyphosate and/or SFM was significantly lower than cover in treatments receiving Piper alone at either rate. By 60 DAT, cover was significantly lower in treatments receiving glyphosate. This is likely a response to both a loss in weed cover and turf cover (see **Tall Fescue** above). This pattern remained through 150 DAT. By 180 DAT, cover was similar in all herbicide treated plots. This is likely due to release of bermudagrass in treatments receiving glyphosate (see **Bermudagrass** above). By 210 DAT, there was no significant differences between herbicide treatments and the untreated plots.

Weed Response to Piper

Grass Weeds. At 7 DAT discoloration was observed on annual ryegrass. Ryegrass control was highest in treatments with glyphosate (60 and 40%). This trend continued through 90 DAT (Chart 100). However, at 90 DAT ryegrass control in the Piper alone treatments was significantly lower than treatments with glyphosate. Ryegrass control in Piper treatments did increased during this period. At 31 DAT, the 8 oz rate of Piper was only slightly better than the 4 oz rate on ryegrass control and significantly better at 60 and 90 DAT. At 119 DAT, all treatments were significantly higher than the 4 oz rate of Piper alone. This pattern remained through 150 DAT.

Control of smooth brome at 90 DAT was significantly higher in treatments receiving glyphosate and Piper plus SFM-75 (Chart 101). This pattern remained through 119 DAT. The pattern was similar at 150 DAT, but was not significant and the 8 oz rate of Piper was similar to Piper at 4 oz plus SFM. By 180 DAT, the two treatments were equal, but still not as high as treatments receiving glyphosate.

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Results and Discussion: Application A (December 4, 2015) (Continued)

Broadleaf Weeds. Hairy vetch control was observed at 7 DAT and was significantly higher in all treatments receiving Piper. This pattern was not as pronounced by 31 DAT and highest control was observed in treatments receiving glyphosate. By 60 DAT, hairy vetch control was significantly higher in treatments with glyphosate and Piper plus SFM. This pattern remained through 150 DAT.

At 30 DAT, control of buckhorn plantain was mixed, but by 60 DAT treatments receiving glyphosate showed significant control (Chart 102). This pattern remained through 150 DAT.

Significant control of Venus's comb was observed during the study (Chart 103). At 31 DAT, treatments receiving glyphosate and Piper plus SFM-75 showed significantly higher control of Venus's comb. This pattern remained through 119 DAT with 100 percent control after 31 DAT. The pattern was similar at 150 DAT, but some germination was observed and Piper plus SFM-75 had the highest control at 97.3 percent followed by SFM-75 plus Milestone plus glyphosate at 86.3 percent.

Results and Discussion: Application B (January 29, 2016)

Application B Overview. At 0 DAT, overall cover ranged from 78.8 to 80% on average. Bahiagrass (*Paspalum notatum*) and bermudagrass (*Cynodon dactylon*) dormant cover was present at the time of application. Tall fescue (*Schedonorus arundinaceus*) was the dominant green turf at the time of application. Other species present included annual ryegrass (*Lolium multiflorum*), buckhorn plantain (*Plantago lanceolata*), hairy vetch (*Vicia villosa*), and Venus's comb (*Scandix pecten-veneris*).

Bahiagrass. In the spring of 2016 (60 DAT), significant discoloration of bahiagrass was observed (Chart 104). Discoloration was significantly higher in treatments receiving glyphosate followed by Piper plus SFM-75. This pattern remained through 90 DAT. Discoloration was still present at 119 DAT and not observed at 150 DAT. Very little discoloration was observed in treatments with Piper alone at either rate. Bahiagrass cover was not significantly different at 60 DAT during the study (Chart 105). Interestingly, cover in treatments receiving glyphosate and Piper plus SFM-75 was highest from 90 through 119 DAT. There were no significant differences at 150 DAT. Compared to application A (see **Bahiagrass** above), this must indicate that bahiagrass was fully dormant at the time of application on January 29.

Bermudagrass. No discoloration was observed on bermudagrass. There was no significant differences in bermudagrass cover during the study (Chart 106). Interestingly, bermudagrass cover was higher in the untreated plots. This is somewhat counter the pattern following Application A (see **Bermudagrass** above).

Tall Fescue. At 60 DAT tall fescue was significantly discolored (Chart 107), particularly in treatments receiving glyphosate which had a rating of 1.8 and 2.3, respectively. At 90 and 119 DAT, discoloration was still observed and significant, but not as pronounced. This was also reflected in control (damage), which was 91.3 and 75% on average in treatments receiving glyphosate at 31 DAT (Chart 108). By 60 DAT, damage was up to 88.8 and 70% in treatments receiving glyphosate. This pattern was similar at 90 and 119 DAT. Damage was significantly less in treatments receiving Piper alone at either rate. This again illustrates the potential long-term damage that's possible even at low rates of glyphosate (18 fl oz/A) under the conditions in this study.

Overall Cover Response to Piper

Overall cover was significantly reduced by 60 DAT (Chart 109). This is expected due to control of weed species or turf damage by herbicide applications in the study. At 60 DAT, cover in treatments receiving glyphosate was significantly lower than cover in other treatments. That pattern remained at 90 and 119 DAT. By 150 DAT, cover was similar across all treatments with cover slightly higher in treatments receiving Piper alone. This is likely a response to both a loss in weed cover and turf cover (see **Tall Fescue** above).

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)**Results and Discussion: Application B (January 29, 2016) (Continued)****Weed Response to Piper**

Grass Weeds. Ryegrass control was significantly higher in treatments receiving glyphosate (87.8 and 98%, respectively) and Piper plus SFM-75 at 60 DAT (Chart 110). This trend continued through 119 DAT.

Control of smooth brome at 31 DAT was significantly higher in treatments receiving glyphosate (Chart 111). This pattern remained through 90 DAT. At 119 DAT, control in glyphosate treatments was still significantly higher, but not higher than the high rate of Piper alone (80%).

Southern crabgrass (*Digitaria ciliaris*) was observed in the study at 180 DAT. Cover ranged from 2 to 5.3% on average. However, differences were not significant at the time of rating on 27 July 2016.

Broadleaf Weeds. Hairy vetch control was observed at 60 DAT and was significantly higher in treatments receiving glyphosate and Piper plus SFM-75. This pattern remained through 119 DAT.

At 60 DAT, control of buckhorn plantain was significantly higher in treatments receiving glyphosate. This pattern remained through 119 DAT.

Significant control of Venus's comb was observed during the study (Chart 113). At 31 DAT, treatments receiving glyphosate showed significantly higher control of Venus's comb, followed by Piper plus SFM-75. This pattern remained through 60 DAT with 100% control in treatments receiving glyphosate. A similar pattern was observed at 90 DAT, but some germination was observed in the treatment receiving Piper plus glyphosate. This pattern was similar at 119 DAT.

Overall Conclusions

Timing did not seem to be as important in weed control as it did for turf tolerance. Treatments containing glyphosate were detrimental to both bahiagrass and tall fescue following Application A, but only to tall fescue following Application B. Bermudagrass did not respond directly to either application, but was released from competition, particularly Application A. This is likely due mostly to the loss of bahiagrass, a warm-season competitor of bermudagrass. This study illustrates the importance of turf species mixtures to roadsides cover by resiliency to herbicide injury.

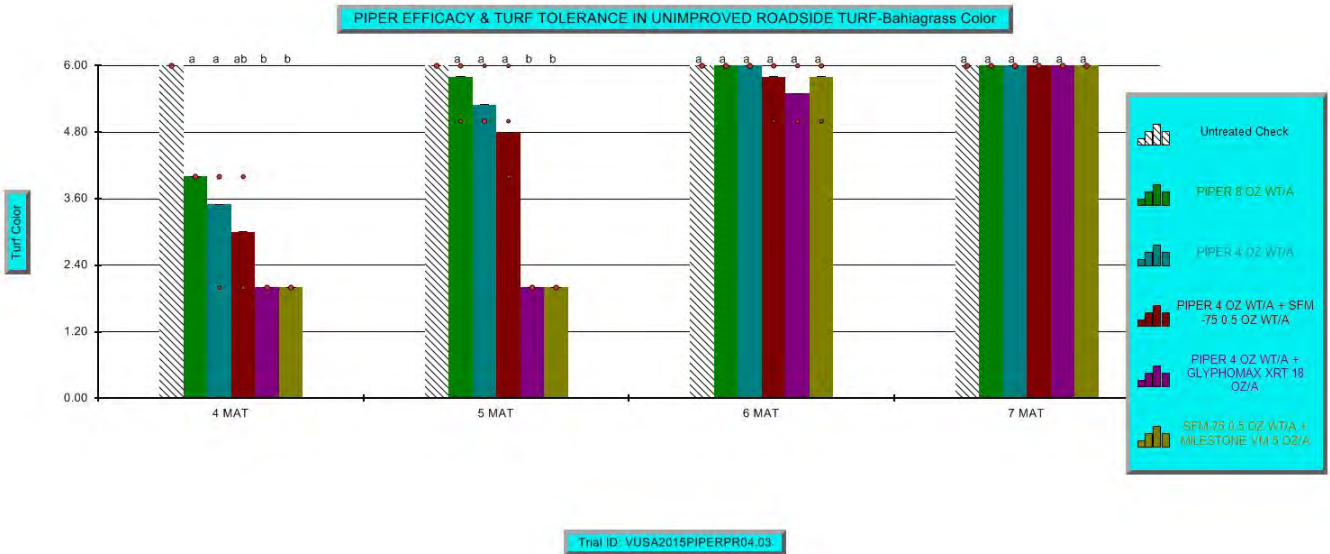
Glyphosate still remained a strong weed control component in the study. Hence, its addition to Piper in this study was noticeable. It's not likely that the ryegrass in this study was ALS and/or glyphosate resistant. Under resistance conditions, Piper may have shown a more competitive performance in ryegrass control during the study. In general, the higher rate of Piper performed better than the lower rate, but usually was not significantly.

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Application Description

	A	B
Application Date:	Dec-4-2015	Jan-29-2016
Appl. Start Time:	10:30 AM	10:00 AM
Interval to Prev. Appl., Unit:		56 DAYS
Application Method:	SPRAY	SPRAY
Application Timing:	NCPOPE	NCPOPE
Application Placement:	FOLIAR	FOLIAR
Applied By:	VMaddox	VMaddox
Air Temperature, Unit:	52 F	55 F
% Relative Humidity:	65	65
Wind Velocity, Unit:	5 MPH	6 MPH
Wind Direction:	N	S
Dew Presence (Y/N):	N no	N no
Soil Moisture:	NORMAL	NORMAL
% Cloud Cover:	0	0

Chart 94. Bahiagrass (*Paspalum notatum*) color (1-9 Scale) at 4, 5, 6, and 7 Months after Application A (MAT).

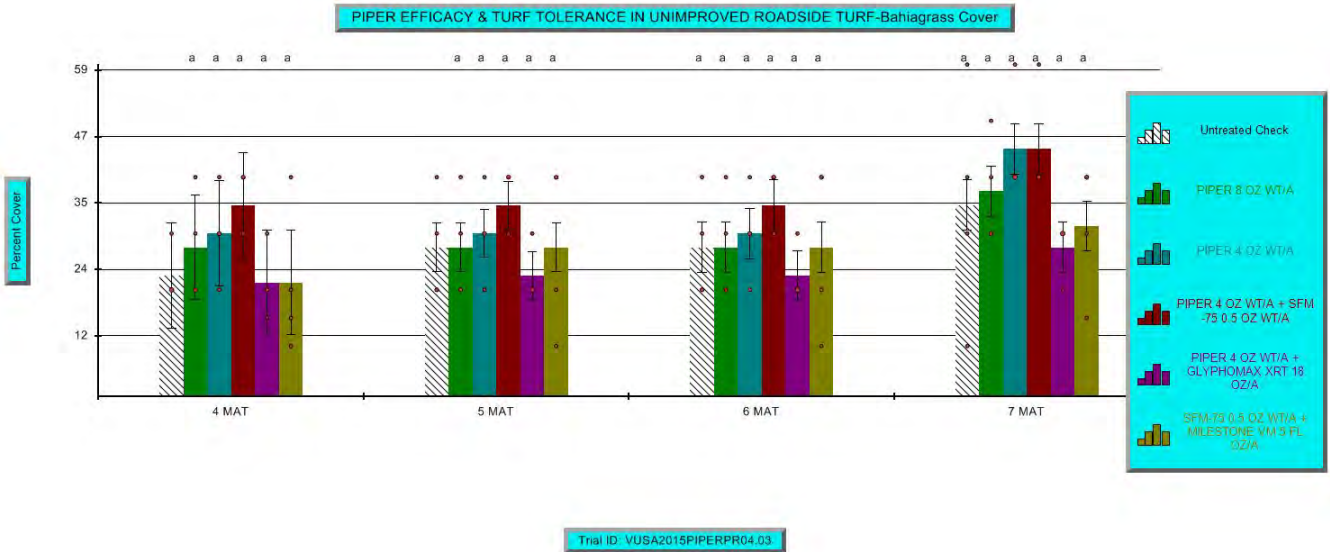


PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Application Equipment		
	A	B
Equipment Type:	BACCAI	BACCAI
Operation Pressure, Unit:	25 PSI	25
Nozzle Type:	FLAFAN	FLAFAN
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	3 FT	3 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	WATER	WATER
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 liters	2 liters
Tank Mix (Y/N):	Y yes	Y yes

Reps: 4 Appl Code: A Plots: 6 by 30 feet
 Spray vol: 25 GAL/AC Mix Size: 2 liters (1.5642 liters calculated mix size)

Chart 95. Bahiagrass (*Paspalum notatum*) cover at 4, 5, 6, and 7 Months after Application A (MAT).

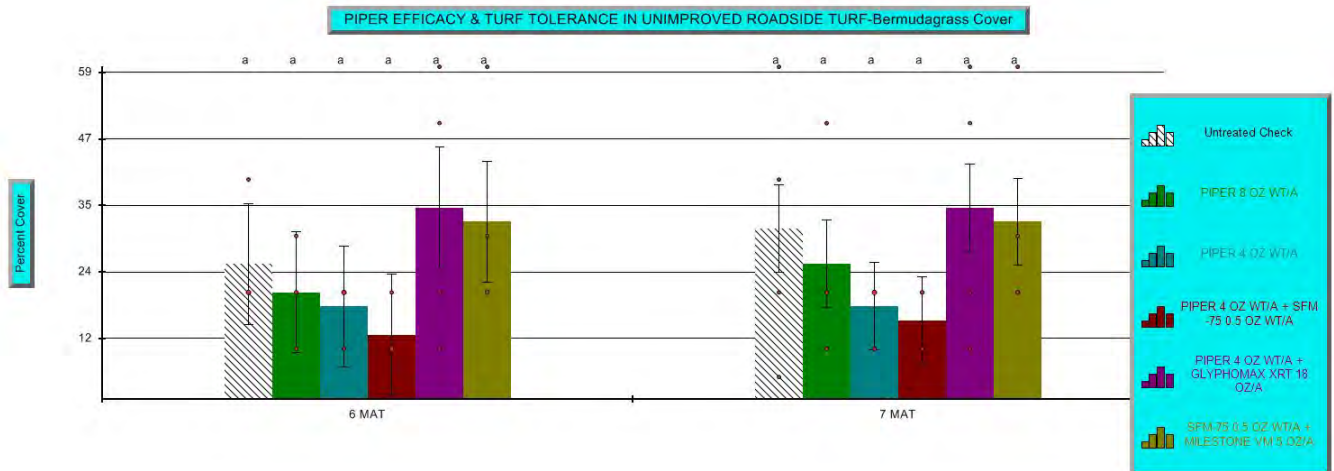


PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Re-Entry Interval	Rate Rate	Rate Unit	Growth Stage	Appl Code	Amt Product to Measure	Rep 1	2	3	4
1					UNTREATED CHECK				AB		101	203	308	411
2	PIPER COC	76%W/W 100%W/W		WG OC	FLUMIOXZN+PYROXSLFN PETROLEUM OIL CONC	8oz wt/a 1% v/v		FOSP FOSP	A A	4.793 g/mx 20.0 ml/mx	102	211	310	405
3	PIPER COC	76%W/W 100%W/W		WG OC	FLUMIOXZN+PYROXSLFN PETROLEUM OIL CONC	4oz wt/a 1% v/v		FOSP FOSP	A A	2.397 g/mx 20.0 ml/mx	103	207	311	408
4	PIPER SFM-75 COC	76%W/W 75%W/W 100%W/W		WG WG OC	FLUMIOXZN+PYROXSLFN SULFOMETURON-METHYL PETROLEUM OIL CONC	4oz wt/a 0.5oz wt/a 1% v/v		FOSP FOSP FOSP	A A A	2.397 g/mx 0.2996 g/mx 20.0 ml/mx	104	205	303	402
5	PIPER GLYPHOMAX XRT(SALT) COC	76%W/W 5.4LBA/GAL 100%W/W		WG SL OC	FLUMIOXZN+PYROXSLFN GLYPHOSATE-IPA(SALT) PETROLEUM OIL CONC	4oz wt/a 18fl oz/a 1% v/v		FOSP FOSP FOSP	A A A	2.397 g/mx 11.25 ml/mx 20.0 ml/mx	105	206	301	409
6	SFM-75 MILESTONE VM GLYPHOMAX XRT(SALT) COC	75%W/W 2LBA/GAL 5.4LBA/GAL 100%W/W		WG EC SL OC	SULFOMETURON-METHYL AMINOPYRALID GLYPHOSATE-IPA(SALT) PETROLEUM OIL CONC	0.5oz wt/a 5fl oz/a 18fl oz/a 1% v/v		FOSP FOSP FOSP FOSP	A A A A	0.2996 g/mx 3.125 ml/mx 11.25 ml/mx 20.0 ml/mx	106	201	302	404

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Re-Entry Interval	Rate Rate	Rate Unit	Growth Stage	Appl Code	Amt Product to Measure	Rep 1	2	3	4
1					UNTREATED CHECK				AB		101	203	308	411
7	PIPER COC	76%W/W 100%W/W		WG OC	FLUMIOXZN+PYROXSLFN PETROLEUM OIL CONC	8oz wt/a 1% v/v		FOSP FOSP	B B	4.793 g/mx 20.0 ml/mx	107	208	305	410
8	PIPER COC	76%W/W 100%W/W		WG OC	FLUMIOXZN+PYROXSLFN PETROLEUM OIL CONC	4oz wt/a 1% v/v		FOSP FOSP	B B	2.397 g/mx 20.0 ml/mx	108	209	304	403
9	PIPER GLYPHOMAX XRT(SALT) COC	76%W/W 5.4LBA/GAL 100%W/W		WG SL OC	FLUMIOXZN+PYROXSLFN GLYPHOSATE-IPA(SALT) PETROLEUM OIL CONC	4oz wt/a 18fl oz/a 1% v/v		FOSP FOSP FOSP	B B B	2.397 g/mx 11.25 ml/mx 20.0 ml/mx	109	204	307	406
10	PIPER SFM-75 COC	76%W/W 75%W/W 100%W/W		WG WG OC	FLUMIOXZN+PYROXSLFN SULFOMETURON-METHYL PETROLEUM OIL CONC	4oz wt/a 0.5oz wt/a 1% v/v		FOSP FOSP FOSP	B B B	2.397 g/mx 0.2996 g/mx 20.0 ml/mx	110	202	306	401
11	SFM-75 MILESTONE VM GLYPHOMAX XRT(SALT) COC	75%W/W 2LBA/GAL 5.4LBA/GAL 100%W/W		WG EC SL OC	SULFOMETURON-METHYL AMINOPYRALID GLYPHOSATE-IPA(SALT) PETROLEUM OIL CONC	0.5oz wt/a 5fl oz/a 18fl oz/a 1% v/v		FOSP FOSP FOSP FOSP	B B B B	0.2996 g/mx 3.125 ml/mx 11.25 ml/mx 20.0 ml/mx	111	210	309	407

Chart 96. Bermudagrass (*Cynodon dactylon*) cover at 6 and 7 Months after Application A (MAT).



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	Overall		
Pest Code	LOLMU	PLALA	VICVI	Spadix pecten->			
Pest Scientific Name	Lolium multifi>	Plantago lance>	Vicia villosa				
Pest Name	Bearded ryegra>	Buckhorn plant>	Hairy vetch				
Crop Code							
BBCH Scale							
Crop Scientific Name							
Crop Name							
Part Rated	PLANT P		PLANT P				
Rating Date	Dec-4-2015	Dec-4-2015	Dec-4-2015	Dec-4-2015	Dec-4-2015		
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA		
Number of Subsamples	1	1	1	1	1		
SE Group No.	6	7	1	8	9		
Days After First/Last Applic.	0 0	0 0	0 0	0 0	0 0		
ARM Action Codes							
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	1	2	3	4	5
1		AB	10.0	8.8	10.0	10.0	80.0
2PIPER	8oz wt/a	A	10.0	13.8	10.0	8.8	80.0
COC	1% v/v	A					
3PIPER	4oz wt/a	A	10.0	15.0	10.0	7.5	80.0
COC	1% v/v	A					
4PIPER	4oz wt/a	A	10.0	16.3	10.0	10.0	80.0
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A	10.0	15.0	10.0	10.0	80.0
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A	10.0	13.8	10.0	10.0	80.0
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B					
COC	1% v/v	B					
8PIPER	4oz wt/a	B					
COC	1% v/v	B					
9PIPER	4oz wt/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B					
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B					
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various				4.83		2.95	
Standard Deviation			0.00	3.21	0.00	1.95	0.00
CV			0.0	23.32	0.0	20.85	0.0
Bartlett's X2			0.0	2.076	0.0	0.771	0.0
P(Bartlett's X2)				0.838		0.68	
Skewness				-0.0233		-0.6411	
Kurtosis				-0.8753		2.0824*	
Mean Sep. Test							
Replicate F			0.000	15.270	0.000	3.182	0.000
Replicate Prob(F)			1.0000	0.0001	1.0000	0.0546	1.0000
Treatment F			0.000	2.676	0.000	1.145	0.000
Treatment Prob(F)			1.0000	0.0638	1.0000	0.3797	1.0000

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type							W Weed	
Pest Code							LOLMU	
Pest Scientific Name							Lolium multifl>	Overall
Pest Name							Bearded ryegra>	
Crop Code	PASNO			FESAR			CYNDA	
BBCH Scale	BGRM			BGRM			BGRM	
Crop Scientific Name	Paspalum notat>			Schedonorus ar>			Cynodon dactyl>	
Crop Name	Water couch			Tall fescue			Dog's-tooth gr>	
Part Rated	PLANT C			PLANT C			PLANT P	
Rating Date	Dec-4-2015			Dec-4-2015			Dec-4-2015	
Rating Type	GROUND			GROUND			GROUND	
Rating Unit	%AREA			%AREA			%AREA	
Number of Subsamples	1			1			1	
SE Group No.	10			11			12	
Days After First/Last Applic.	0 0			0 0			0 0	
ARM Action Codes							7 7	
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	6	7	8	9	10	
1		AB	23.8	17.5	47.5	6.0a	80.0a	
2PIPER	8oz wt/a	A	18.8	13.8	55.0	3.8b	72.5c	
COC	1% v/v	A						
3PIPER	4oz wt/a	A	30.0	10.0	47.5	4.0b	72.5c	
COC	1% v/v	A						
4PIPER	4oz wt/a	A	25.0	13.8	47.5	3.8b	76.3b	
SFM-75	0.5oz wt/a	A						
COC	1% v/v	A						
5PIPER	4oz wt/a	A	27.5	12.5	47.5	2.3c	70.0c	
GLYPHOMAX XRT(SALT)	18fl oz/a	A						
COC	1% v/v	A						
6SFM-75	0.5oz wt/a	A	20.0	13.8	50.0	2.3c	71.3c	
MILESTONE VM	5fl oz/a	A						
GLYPHOMAX XRT(SALT)	18fl oz/a	A						
COC	1% v/v	A						
7PIPER	8oz wt/a	B						
COC	1% v/v	B						
8PIPER	4oz wt/a	B						
COC	1% v/v	B						
9PIPER	4oz wt/a	B						
GLYPHOMAX XRT(SALT)	18fl oz/a	B						
COC	1% v/v	B						
10PIPER	4oz wt/a	B						
SFM-75	0.5oz wt/a	B						
COC	1% v/v	B						
11SFM-75	0.5oz wt/a	B						
MILESTONE VM	5fl oz/a	B						
GLYPHOMAX XRT(SALT)	18fl oz/a	B						
COC	1% v/v	B						
LSD P=Various			11.54	8.05	13.00	0.55	3.18	
Standard Deviation			7.66	5.34	8.63	0.37	2.11	
CV			31.68	39.45	17.55	9.96	2.86	
Bartlett's X2			2.98	1.698	2.375	0.0	0.119	
P(Bartlett's X2)			0.561	0.889	0.795	.	0.989	
Skewness			0.2482	0.7673	0.561	0.4375	0.4975	
Kurtosis			1.1287	-0.8535	-0.6636	-0.5366	-1.2019	
Mean Sep. Test						LSD.05	LSD.05	
Replicate F			6.161	15.511	7.537	2.500	1.563	
Replicate Prob(F)			0.0061	0.0001	0.0026	0.0991	0.2398	
Treatment F			1.265	0.825	0.493	57.500	12.375	
Treatment Prob(F)			0.3290	0.5512	0.7769	0.0001	0.0001	

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type		W Weed	W Weed	W Weed			
Pest Code		LOLMU	VICVI	LOLMU			
Pest Scientific Name		Lolium multifl>	Vicia villosa	Lolium multifl>	Overall		
Pest Name		Bearded ryegra>	Hairy vetch	Bearded ryegra>			
Crop Code	FESAR						
BBCH Scale	BGRM						
Crop Scientific Name	Schedonorus ar>						
Crop Name	Tall fescue						
Part Rated		PLANT P	PLANT P	PLANT P			
Rating Date	Dec-11-2015	Dec-11-2015	Dec-11-2015	Jan-4-2016	Jan-4-2016		
Rating Type	COLOR	CONTRO	CONTRO	CONTRO	GROUND		
Rating Unit	1-9	%UNCK	%UNCK	%UNCK	%AREA		
Number of Subsamples	1	1	1	1	1		
SE Group No.	15	16	17	18	19		
Days After First/Last Applic.	7 7	7 7	7 7	31 31	31 31		
ARM Action Codes	L05	EC L05E	EC L05E	EC L05E	L05		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	11	12	13	14	15
1		AB	7.0a	0.0	0.0	0.0	80.0a
2PIPER	8oz wt/a	A	5.3b	22.5bc	35.0a	82.5b	70.0b
COC	1% v/v	A					
3PIPER	4oz wt/a	A	5.5b	27.5bc	42.5a	80.0b	70.0b
COC	1% v/v	A					
4PIPER	4oz wt/a	A	5.5b	10.0c	17.5b	94.5a	63.8c
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A	3.5c	60.0a	40.0a	96.5a	61.3c
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A	3.5c	40.0ab	7.5c	98.0a	65.0c
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B					
COC	1% v/v	B					
8PIPER	4oz wt/a	B					
COC	1% v/v	B					
9PIPER	4oz wt/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B					
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B					
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various			0.59	24.24	8.55	4.28	3.81
Standard Deviation			0.39	15.73	5.55	2.78	2.53
CV			7.75	49.16	19.48	3.08	3.7
Bartlett's X2			0.089	4.618	2.882	2.854	1.172
P(Bartlett's X2)			0.999	0.329	0.578	0.24	0.556
Skewness			-0.0823	0.3794	-0.2888	-0.4446	0.4375
Kurtosis			-0.9911	-1.2052	-1.2874	-1.7703	-0.5366
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			5.364	1.791	1.135	1.043	2.174
Replicate Prob(F)			0.0104	0.2024	0.3741	0.4088	0.1336
Treatment F			47.400	5.828	30.243	36.504	28.043
Treatment Prob(F)			0.0001	0.0076	0.0001	0.0001	0.0001

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type		W Weed	W Weed		W Weed		
Pest Code		VICVI	PLALA		Spadix pecten->		
Pest Scientific Name		Vicia villosa	Plantago lance>				
Pest Name		Hairy vetch	Buckhorn plant>				
Crop Code	FESAR			FESAR			
BBCH Scale	BGRM			BGRM			
Crop Scientific Name	Schedonorus ar>			Schedonorus ar>			
Crop Name	Tall fescue			Tall fescue			
Part Rated		PLANT P					
Rating Date	Jan-4-2016	Jan-4-2016	Jan-4-2016	Jan-4-2016	Jan-4-2016		
Rating Type	COLOR	CONTRO	CONTRO	CONTRO	CONTRO		
Rating Unit	1-9	%UNCK	%UNCK	%UNCK	%UNCK		
Number of Subsamples	1	1	1	1	1		
SE Group No.	20	21	22	23	24		
Days After First/Last Applic.	31 31	31 31	31 31	31 31	31 31		
ARM Action Codes	L05	EC L05E	EC L05E	L05	EC L05E		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	16	17	18	19	20
1		AB	7.0a	2.5	0.0	0.0d	0.0
2PIPER	8oz wt/a	A	6.0b	80.0b	45.0bc	22.5bc	47.5b
COC	1% v/v	A					
3PIPER	4oz wt/a	A	6.0b	55.0c	37.5c	15.0c	52.5b
COC	1% v/v	A					
4PIPER	4oz wt/a	A	6.0b	80.0b	60.0ab	25.0b	92.0a
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A	2.0c	95.0ab	70.0a	82.5a	99.0a
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A	2.0c	100.0a	47.5bc	77.5a	100.0a
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B					
COC	1% v/v	B					
8PIPER	4oz wt/a	B					
COC	1% v/v	B					
9PIPER	4oz wt/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B					
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B					
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various				17.57	17.17	8.59	14.42
Standard Deviation			0.00	11.40	11.14	5.70	9.36
CV			0.0	13.9	21.43	15.37	11.97
Bartlett's X2			0.0	0.683	1.851	4.469	11.905
P(Bartlett's X2)			.	0.711	0.604	0.346	0.008*
Skewness			-0.6459	-0.7661	-0.1798	0.4919	-0.7233
Kurtosis			-1.5402	-0.1717	-1.444	-1.4624	-1.0019
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			0.000	0.103	0.966	0.897	2.098
Replicate Prob(F)			1.0000	0.9570	0.4403	0.4654	0.1539
Treatment F			0.000	9.462	5.376	145.667	30.848
Treatment Prob(F)			1.0000	0.0011	0.0102	0.0001	0.0001

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	Overall	FESAR	FESAR	W Weed		
Pest Code	LOLMU		BGRM	BGRM	VICVI		
Pest Scientific Name	Lolium multifl>		Schedonorus ar>	Schedonorus ar>	Vicia villosa		
Pest Name	Bearded ryegra>		Tall fescue	Tall fescue	Hairy vetch		
Crop Code							
BBCH Scale							
Crop Scientific Name							
Crop Name							
Part Rated	PLANT P				PLANT P		
Rating Date	Feb-2-2016	Feb-2-2016	Feb-2-2016	Feb-2-2016	Feb-2-2016		
Rating Type	CONTRO	GROUND	COLOR	CONTRO	CONTRO		
Rating Unit	%UNCK	%AREA	1-9	%UNCK	%UNCK		
Number of Subsamples	1	1	1	1	1		
SE Group No.	25	26	27	28	29		
Days After First/Last Applic.	60 4	60 4	60 4	60 4	60 4		
ARM Action Codes	EC L05E	L05	L05	EC L05E	EC L05E		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	21	22	23	24	25
1		AB	0.0	80.0a	7.0a	0.0	0.0
2PIPER	8oz wt/a	A	87.5b	56.3b	6.0b	32.5c	85.0b
COC	1% v/v	A					
3PIPER	4oz wt/a	A	80.0c	58.8b	6.3ab	27.5c	62.5c
COC	1% v/v	A					
4PIPER	4oz wt/a	A	97.8a	31.3c	3.0c	55.0b	100.0a
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A	99.5a	5.0d	1.0d	95.0a	100.0a
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A	99.5a	11.3d	1.5d	92.5a	100.0a
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B					
COC	1% v/v	B					
8PIPER	4oz wt/a	B					
COC	1% v/v	B					
9PIPER	4oz wt/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B					
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B					
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various			6.60	11.81	0.81	8.08	14.88
Standard Deviation			4.29	7.84	0.53	5.24	9.66
CV			4.62	19.39	12.97	8.67	10.79
Bartlett's X2			18.088	1.919	1.02	3.887	0.808
P(Bartlett's X2)			0.001*	0.589	0.796	0.274	0.369
Skewness			-0.8258	0.0597	-0.1184	0.0699	-1.6974*
Kurtosis			-1.305	-1.5359	-1.8068	-1.7923	2.5896*
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			0.424	1.380	1.699	1.758	0.196
Replicate Prob(F)			0.7395	0.2871	0.2099	0.2086	0.8968
Treatment F			16.672	56.593	95.680	149.727	11.571
Treatment Prob(F)			0.0001	0.0001	0.0001	0.0001	0.0004

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	Overall			
Pest Code	PLALA	Spadix pecten->	LOLMU				
Pest Scientific Name	Plantago lance>		Lolium multifl>				
Pest Name	Buckhorn plant>		Bearded ryegra>				
Crop Code					FESAR		
BBCH Scale					BGRM		
Crop Scientific Name					Schedonorus ar>		
Crop Name					Tall fescue		
Part Rated			PLANT P				
Rating Date	Feb-2-2016	Feb-2-2016	Mar-3-2016	Mar-3-2016	Mar-3-2016		
Rating Type	CONTRO	CONTRO	CONTRO	GROUND	COLOR		
Rating Unit	%UNCK	%UNCK	%UNCK	%AREA	1-9		
Number of Subsamples	1	1	1	1	1		
SE Group No.	30	31	25	26	27		
Days After First/Last Applic.	60 4	60 4	90 34	90 34	90 34		
ARM Action Codes	EC L05E	EC L05E	EC L05E	L05	L05		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	26	27	28		
1		AB					
2PIPER	8oz wt/a	A	45.0bc	47.5b	82.5b	80.0a	7.0a
COC	1% v/v	A				56.3b	6.0b
3PIPER	4oz wt/a	A	40.0c	50.0b	67.5c	58.8b	6.3ab
COC	1% v/v	A					
4PIPER	4oz wt/a	A	60.0b	100.0a	97.8a	31.3c	3.0c
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A	87.5a	100.0a	99.5a	5.0d	1.0d
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A	77.5a	100.0a	99.0a	11.3d	1.5d
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B					
COC	1% v/v	B					
8PIPER	4oz wt/a	B					
COC	1% v/v	B					
9PIPER	4oz wt/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B					
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B					
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various			17.17	13.04	14.47	11.81	0.81
Standard Deviation			11.14	8.47	9.39	7.84	0.53
CV			17.97	10.65	10.52	19.39	12.97
Bartlett's X2			2.934	0.198	27.611	1.919	1.02
P(Bartlett's X2)			0.569	0.656	0.001*	0.589	0.796
Skewness			-0.1434	-0.7397	-1.251*	0.0597	-0.1184
Kurtosis			-1.2538	-1.2013	-0.0423	-1.5359	-1.8068
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			0.966	1.930	0.230	1.380	1.699
Replicate Prob(F)			0.4403	0.1786	0.8735	0.2871	0.2099
Treatment F			13.430	44.023	8.965	56.593	95.680
Treatment Prob(F)			0.0002	0.0001	0.0014	0.0001	0.0001

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type		W Weed	W Weed	W Weed	W Weed
Pest Code		VICVI	PLALA		
Pest Scientific Name		Vicia villosa	Plantago lance>	Spadix pecten->	Bromus inermis
Pest Name		Hairy vetch	Buckhorn plant>		
Crop Code	FESAR				
BBCH Scale	BGRM				
Crop Scientific Name	Schedonorus ar>				
Crop Name	Tall fescue				
Part Rated		PLANT P			
Rating Date	Mar-3-2016	Mar-3-2016	Mar-3-2016	Mar-3-2016	Mar-3-2016
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%UNCK	%UNCK	%UNCK	%UNCK	%UNCK
Number of Subsamples	1	1	1	1	1
SE Group No.	28	29	30	31	32
Days After First/Last Applic.	90 34	90 34	90 34	90 34	90 34
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	31	32	33
1		AB	0.0	0.0	0.0
2PIPER	8oz wt/a	A	32.5c	85.0b	45.0bc
COC	1% v/v	A			47.5b
3PIPER	4oz wt/a	A	27.5c	62.5c	40.0c
COC	1% v/v	A			50.0b
4PIPER	4oz wt/a	A	55.0b	100.0a	60.0b
SFM-75	0.5oz wt/a	A			100.0a
COC	1% v/v	A			99.0a
5PIPER	4oz wt/a	A	95.0a	100.0a	87.5a
GLYPHOMAX XRT(SALT)	18fl oz/a	A			100.0a
COC	1% v/v	A			100.0a
6SFM-75	0.5oz wt/a	A	92.5a	100.0a	77.5a
MILESTONE VM	5fl oz/a	A			100.0a
GLYPHOMAX XRT(SALT)	18fl oz/a	A			99.5a
COC	1% v/v	A			
7PIPER	8oz wt/a	B			
COC	1% v/v	B			
8PIPER	4oz wt/a	B			
COC	1% v/v	B			
9PIPER	4oz wt/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
10PIPER	4oz wt/a	B			
SFM-75	0.5oz wt/a	B			
COC	1% v/v	B			
11SFM-75	0.5oz wt/a	B			
MILESTONE VM	5fl oz/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
LSD P=Various			8.08	14.88	17.17
Standard Deviation			5.24	9.66	11.14
CV			8.67	10.79	17.97
Bartlett's X2			3.887	0.808	2.934
P(Bartlett's X2)			0.274	0.369	0.569
Skewness			0.0699	-1.6974*	-0.1434
Kurtosis			-1.7923	2.5896*	-1.2538
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F			1.758	0.196	0.966
Replicate Prob(F)			0.2086	0.8968	0.4403
Treatment F			149.727	11.571	13.430
Treatment Prob(F)			0.0001	0.0004	0.0002
					13.04
					8.47
					10.65
					0.198
					0.656
					-0.7397
					-1.3312*
					0.1433
					LSD.05
					1.930
					0.5396
					9.826
					0.0001
					0.0009

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type			W Weed				
Pest Code			LOLMU				
Pest Scientific Name			Lolium multifl>	Overall			
Pest Name			Bearded ryegra>				
Crop Code	PASNO	PASNO			FESAR		
BBCH Scale	BGRM	BGRM			BGRM		
Crop Scientific Name	Paspalum notat>	Paspalum notat>			Schedonorus ar>		
Crop Name	Water couch	Water couch			Tall fescue		
Part Rated	PLANT C	PLANT C	PLANT P				
Rating Date	Apr-1-2016	Apr-1-2016	Apr-1-2016	Apr-1-2016	Apr-1-2016		
Rating Type	GROUND	COLOR	CONTRO	GROUND	COLOR		
Rating Unit	%AREA	1-9	%UNCK	%AREA	1-9		
Number of Subsamples	1	1	1	1	1		
SE Group No.	33	34	35	36	37		
Days After First/Last Applic.	119 63	119 63	119 63	119 63	119 63		
ARM Action Codes	EC L05E	EC L05E	EC L05E	L05	L05		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	36	37	38		
1		AB	22.5	6.0	0.0	80.0a	7.0a
2PIPER	8oz wt/a	A	27.5a	4.0a	80.0a	67.5b	6.8ab
COC	1% v/v	A					
3PIPER	4oz wt/a	A	30.0a	3.5ab	52.5b	67.5b	6.3ab
COC	1% v/v	A					
4PIPER	4oz wt/a	A	35.0a	3.0b	96.5a	61.3b	6.0b
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A	21.3a	2.0c	95.0a	37.5c	1.5c
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A	21.3a	2.0c	90.8a	43.8c	1.3c
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B					
COC	1% v/v	B					
8PIPER	4oz wt/a	B					
COC	1% v/v	B					
9PIPER	4oz wt/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B					
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B					
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various			12.60	0.97	19.46	8.41	0.85
Standard Deviation			8.18	0.63	12.63	5.58	0.57
CV			30.29	21.81	15.22	9.36	11.8
Bartlett's X2			2.581	0.061	6.679	9.903	1.184
P(Bartlett's X2)			0.63	0.805	0.083	0.042*	0.881
Skewness			0.0468	0.2177	-1.229*	-0.6194	-0.6695
Kurtosis			-1.1861	-2.1826*	-0.0092	-0.4839	-1.4668
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			2.044	1.833	0.328	1.563	0.478
Replicate Prob(F)			0.1615	0.1948	0.8052	0.2398	0.7022
Treatment F			2.084	8.000	8.312	33.000	89.348
Treatment Prob(F)			0.1460	0.0022	0.0019	0.0001	0.0001

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type		W Weed	W Weed	W Weed	W Weed
Pest Code		VICVI	PLALA		
Pest Scientific Name		Vicia villosa	Plantago lance>	Spadix pecten->	Bromus inermis
Pest Name		Hairy vetch	Buckhorn plant>		
Crop Code	FESAR				
BBCH Scale	BGRM				
Crop Scientific Name	Schedonorus ar>				
Crop Name	Tall fescue				
Part Rated		PLANT P			
Rating Date	Apr-1-2016	Apr-1-2016	Apr-1-2016	Apr-1-2016	Apr-1-2016
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%UNCK	%UNCK	%UNCK	%UNCK	%UNCK
Number of Subsamples	1	1	1	1	1
SE Group No.	38	39	40	41	42
Days After First/Last Applic.	119 63	119 63	119 63	119 63	119 63
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	41	42	43
1		AB	0.0	0.0	0.0
2PIPER	8oz wt/a	A	17.5c	85.0b	8.8b
COC	1% v/v	A			17.5b
3PIPER	4oz wt/a	A	17.5c	62.5c	8.8b
COC	1% v/v	A			20.0b
4PIPER	4oz wt/a	A	27.5b	100.0a	11.3b
SFM-75	0.5oz wt/a	A			100.0a
COC	1% v/v	A			99.0a
5PIPER	4oz wt/a	A	95.0a	100.0a	82.5a
GLYPHOMAX XRT(SALT)	18fl oz/a	A			100.0a
COC	1% v/v	A			100.0a
6SFM-75	0.5oz wt/a	A	92.5a	100.0a	77.5a
MILESTONE VM	5fl oz/a	A			100.0a
GLYPHOMAX XRT(SALT)	18fl oz/a	A			99.5a
COC	1% v/v	A			
7PIPER	8oz wt/a	B			
COC	1% v/v	B			
8PIPER	4oz wt/a	B			
COC	1% v/v	B			
9PIPER	4oz wt/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
10PIPER	4oz wt/a	B			
SFM-75	0.5oz wt/a	B			
COC	1% v/v	B			
11SFM-75	0.5oz wt/a	B			
MILESTONE VM	5fl oz/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
LSD P=Various			5.26	14.88	6.93
Standard Deviation			3.42	9.66	4.50
CV			6.83	10.79	11.91
Bartlett's X2			1.064	0.808	3.704
P(Bartlett's X2)			0.786	0.369	0.448
Skewness			0.3845	-1.6974*	0.4469
Kurtosis			-1.9638	2.5896*	-1.935
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F			3.143	0.196	1.052
Replicate Prob(F)			0.0651	0.8968	0.4055
Treatment F			552.857	11.571	295.268
Treatment Prob(F)			0.0001	0.0004	0.0001

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type			W Weed				
Pest Code			LOLMU				
Pest Scientific Name			Lolium multifl>	Overall			
Pest Name			Bearded ryegra>				
Crop Code	PASNO	PASNO			FESAR		
BBCH Scale	BGRM	BGRM			BGRM		
Crop Scientific Name	Paspalum notat>	Paspalum notat>			Schedonorus ar>		
Crop Name	Water couch	Water couch			Tall fescue		
Part Rated	PLANT C	PLANT C	PLANT P				
Rating Date	May-2-2016	May-2-2016	May-2-2016	May-2-2016	May-2-2016		
Rating Type	GROUND	COLOR	CONTRO	GROUND	COLOR		
Rating Unit	%AREA	1-9	%UNCK	%AREA	1-9		
Number of Subsamples	1	1	1	1	1		
SE Group No.	43	44	45	46	47		
Days After First/Last Applic.	150 94	150 94	150 94	150 94	150 94		
ARM Action Codes	EC L05E	EC L05E	EC L05E	L05	L05		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	46	47	48		
1		AB	27.5	6.0	21.3	82.5a	7.0a
2PIPER	8oz wt/a	A	27.5a	5.8a	85.0a	73.8b	7.0a
COC	1% v/v	A					
3PIPER	4oz wt/a	A	30.0a	5.3ab	52.5b	75.0ab	7.0a
COC	1% v/v	A					
4PIPER	4oz wt/a	A	35.0a	4.8b	94.0a	67.5b	6.8a
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A	22.5a	2.0c	82.5a	53.8c	6.0b
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A	27.5a	2.0c	90.8a	58.8c	6.0b
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B					
COC	1% v/v	B					
8PIPER	4oz wt/a	B					
COC	1% v/v	B					
9PIPER	4oz wt/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B					
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B					
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various			13.42	0.86	20.06	7.73	0.31
Standard Deviation			8.71	0.56	13.02	5.13	0.20
CV			30.56	14.06	16.08	7.48	3.08
Bartlett's X2			4.404	1.774	6.686	5.548	0.0
P(Bartlett's X2)			0.354	0.412	0.153	0.353	.
Skewness			-0.1068	-0.1178	-1.0678*	-0.0877	-0.5515
Kurtosis			-1.0766	-1.8502	-0.2899	-1.1179	-1.8586*
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			1.824	0.595	1.115	0.145	1.000
Replicate Prob(F)			0.1964	0.6305	0.3814	0.9312	0.4199
Treatment F			1.088	42.730	6.458	17.612	23.400
Treatment Prob(F)			0.4057	0.0001	0.0052	0.0001	0.0001

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type		W Weed	W Weed	W Weed	W Weed
Pest Code		VICVI	PLALA		
Pest Scientific Name		Vicia villosa	Plantago lance>	Spadix pecten->	Bromus inermis
Pest Name		Hairy vetch	Buckhorn plant>		
Crop Code	FESAR				
BBCH Scale	BGRM				
Crop Scientific Name	Schedonorus ar>				
Crop Name	Tall fescue				
Part Rated		PLANT P			
Rating Date	May-2-2016	May-2-2016	May-2-2016	May-2-2016	May-2-2016
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%UNCK	%UNCK	%UNCK	%UNCK	%UNCK
Number of Subsamples	1	1	1	1	1
SE Group No.	48	49	50	51	52
Days After First/Last Applic.	150 94	150 94	150 94	150 94	150 94
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	51	52	53
1		AB	0.0	0.0	0.0
2PIPER	8oz wt/a	A	17.5c	85.0b	2.5b
COC	1% v/v	A			5.0c
3PIPER	4oz wt/a	A	17.5c	52.5c	2.5b
COC	1% v/v	A			6.3c
4PIPER	4oz wt/a	A	27.5b	100.0a	5.0b
SFM-75	0.5oz wt/a	A			97.3a
COC	1% v/v	A			85.8a
5PIPER	4oz wt/a	A	95.0a	96.3a	52.5a
GLYPHOMAX XRT(SALT)	18fl oz/a	A			75.0b
COC	1% v/v	A			92.0a
6SFM-75	0.5oz wt/a	A	92.5a	100.0a	42.5a
MILESTONE VM	5fl oz/a	A			86.3ab
GLYPHOMAX XRT(SALT)	18fl oz/a	A			92.0a
COC	1% v/v	A			
7PIPER	8oz wt/a	B			
COC	1% v/v	B			
8PIPER	4oz wt/a	B			
COC	1% v/v	B			
9PIPER	4oz wt/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
10PIPER	4oz wt/a	B			
SFM-75	0.5oz wt/a	B			
COC	1% v/v	B			
11SFM-75	0.5oz wt/a	B			
MILESTONE VM	5fl oz/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
LSD P=Various			5.26	10.80	20.48
Standard Deviation			3.42	7.01	13.29
CV			6.83	8.08	63.29
Bartlett's X2			1.064	1.617	21.877
P(Bartlett's X2)			0.786	0.445	0.001*
Skewness			0.3845	-1.3305*	1.0854*
Kurtosis			-1.9638	0.5704	-0.5817
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F			3.143	0.364	2.887
Replicate Prob(F)			0.0651	0.7800	0.0796
Treatment F			552.857	32.898	13.557
Treatment Prob(F)			0.0001	0.0001	0.0002
					13.50
					8.76
					16.24
					14.357
					0.006*
					-0.2547
					-1.9124
					LSD.05
					2.925
					0.0772
					104.672
					0.0001
					0.272
					0.8447
					3.195
					0.0528

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	Overall	W Weed	W Weed
Pest Code	LOLMU		VICVI	PLALA
Pest Scientific Name	Lolium multifl>		Vicia villosa	Plantago lance>
Pest Name	Bearded ryegra>		Hairy vetch	Buckhorn plant>
Crop Code			FESAR	
BBCH Scale			BGRM	
Crop Scientific Name			Schedonorus ar>	
Crop Name			Tall fescue	
Part Rated	PLANT P		PLANT P	
Rating Date	Jan-29-2016	Jan-29-2016	Jan-29-2016	Jan-29-2016
Rating Type	GROUND	GROUND	GROUND	GROUND
Rating Unit	%AREA	%AREA	%AREA	%AREA
Number of Subsamples	1	1	1	1
SE Group No.	53	57	59	55
Days After First/Last Applic.	56 56	56 56	56 56	56 56
ARM Action Codes				
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code		
1		AB	56	60
			57	
			58	
			59	
				60
2PIPER	8oz wt/a	A	10.0	12.5
COC	1% v/v	A	78.8	
3PIPER	4oz wt/a	A		
COC	1% v/v	A		
4PIPER	4oz wt/a	A		
SFM-75	0.5oz wt/a	A		
COC	1% v/v	A		
5PIPER	4oz wt/a	A		
GLYPHOMAX XRT(SALT)	18fl oz/a	A		
COC	1% v/v	A		
6SFM-75	0.5oz wt/a	A		
MILESTONE VM	5fl oz/a	A		
GLYPHOMAX XRT(SALT)	18fl oz/a	A		
COC	1% v/v	A		
7PIPER	8oz wt/a	B	10.0	18.8
COC	1% v/v	B	78.8	25.0
8PIPER	4oz wt/a	B	10.0	17.5
COC	1% v/v	B	78.8	23.8
9PIPER	4oz wt/a	B	10.0	16.3
GLYPHOMAX XRT(SALT)	18fl oz/a	B	78.8	22.5
COC	1% v/v	B		12.5
10PIPER	4oz wt/a	B	10.0	18.8
SFM-75	0.5oz wt/a	B	80.0	20.0
COC	1% v/v	B		11.3
11SFM-75	0.5oz wt/a	B	10.0	17.5
MILESTONE VM	5fl oz/a	B	78.8	26.3
GLYPHOMAX XRT(SALT)	18fl oz/a	B		10.0
COC	1% v/v	B		
LSD P=Various			2.72	5.19
Standard Deviation	0.00		1.81	3.45
CV	0.0		2.29	20.42
Bartlett's X2	0.0		0.0	5.243
P(Bartlett's X2)				0.837
Skewness			-1.534*	1.5225*
Kurtosis			0.3773	0.6098
Mean Sep. Test				2.5859*
Replicate F	0.000		4.574	1.300
Replicate Prob(F)	1.0000		0.0182	0.3109
Treatment F	0.000		0.319	1.200
Treatment Prob(F)	1.0000		0.8937	0.3558

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	Overall			
Pest Code							
Pest Scientific Name	Spadix pecten->	Bromus inermis	Lolium multifid-> Bearded ryegrass		FESAR		
Pest Name					BGRM		
Crop Code					Schedonorus ar-> Tall fescue		
BBCH Scale							
Crop Scientific Name							
Crop Name							
Part Rated							
Rating Date	Jan-29-2016	Jan-29-2016	Feb-5-2016	Feb-5-2016	Feb-5-2016		
Rating Type	GROUND	GROUND	COLOR	GROUND	COLOR		
Rating Unit	%AREA	%AREA	1-9	%AREA	1-9		
Number of Subsamples	1	1	1	1	1		
SE Group No.	56	60	61	62	63		
Days After First/Last Applic.	56 56	56 56	63 7	63 7	63 7		
ARM Action Codes			L05	L05	L05		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	61	62	63	64	65
1		AB	32.5	7.5	6.0a	80.0a	7.0a
2PIPER	8oz wt/a	A					
COC	1% v/v	A					
3PIPER	4oz wt/a	A					
COC	1% v/v	A					
4PIPER	4oz wt/a	A					
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A					
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B	20.0	7.5	5.0b	75.0b	6.0b
COC	1% v/v	B					
8PIPER	4oz wt/a	B	20.0	11.3	5.0b	75.0b	6.0b
COC	1% v/v	B					
9PIPER	4oz wt/a	B	22.5	8.8	2.0d	70.0c	5.0c
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B	23.8	12.5	4.5c	75.0b	6.0b
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B	20.0	8.8	2.0d	70.0c	5.0c
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various			12.50	6.39	0.36	.	.
Standard Deviation			8.30	4.24	0.24	0.00	0.00
CV			35.87	45.24	5.77	0.0	0.0
Bartlett's X2			16.911	1.998	0.0	0.0	0.0
P(Bartlett's X2)			0.005*	0.849	.	.	.
Skewness			3.1561*	0.8523	-0.4339	0.2438	0.2438
Kurtosis			13.0855*	-0.3051	-1.544	-0.8124	-0.8124
Mean Sep. Test					LSD.05	LSD.05	LSD.05
Replicate F			1.630	3.919	1.000	0.000	0.000
Replicate Prob(F)			0.2246	0.0300	0.4199	1.0000	1.0000
Treatment F			1.371	0.938	204.600	0.000	0.000
Treatment Prob(F)			0.2897	0.4844	0.0001	1.0000	1.0000

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	LOLMU	VICVI	PLALA	Spadix pecten->	LOLMU
Pest Scientific Name	Lolium multifl>	Vicia villosa	Plantago lance>		Lolium multifl>
Pest Name	Bearded ryegra>	Hairy vetch	Buckhorn plant>		Bearded ryegra>
Crop Code					
BBCH Scale					
Crop Scientific Name					
Crop Name					
Part Rated	PLANT P	PLANT P			PLANT P
Rating Date	Feb-5-2016	Feb-5-2016	Feb-5-2016	Feb-5-2016	Feb-29-2016
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	COLOR
Rating Unit	%UNCK	%UNCK	%UNCK	%UNCK	1-9
Number of Subsamples	1	1	1	1	1
SE Group No.	45	64	65	66	67
Days After First/Last Applic.	63 7	63 7	63 7	63 7	87 31
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	L05
Trt Treatment	Rate	Appl	Rate	Appl	Rate
No. Name	Rate Unit	Code	Rate Unit	Code	Rate Unit
1		AB	0.0		6.0a
2PIPER	8oz wt/a	A			
COC	1% v/v	A			
3PIPER	4oz wt/a	A			
COC	1% v/v	A			
4PIPER	4oz wt/a	A			
SFM-75	0.5oz wt/a	A			
COC	1% v/v	A			
5PIPER	4oz wt/a	A			
GLYPHOMAX XRT(SALT)	18fl oz/a	A			
COC	1% v/v	A			
6SFM-75	0.5oz wt/a	A			
MILESTONE VM	5fl oz/a	A			
GLYPHOMAX XRT(SALT)	18fl oz/a	A			
COC	1% v/v	A			
7PIPER	8oz wt/a	B	17.5c	17.5a	4.0b
COC	1% v/v	B			
8PIPER	4oz wt/a	B	17.5c	12.5a	3.8b
COC	1% v/v	B			
9PIPER	4oz wt/a	B	65.0a	27.5a	1.3c
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
10PIPER	4oz wt/a	B	35.0b	12.5a	2.3c
SFM-75	0.5oz wt/a	B			
COC	1% v/v	B			
11SFM-75	0.5oz wt/a	B	62.5a	22.5a	1.3c
MILESTONE VM	5fl oz/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
LSD P=Various			10.98	14.06	1.30
Standard Deviation			7.13	9.13	0.86
CV			18.05	49.34	27.98
Bartlett's X2			2.507	4.844	6.123
P(Bartlett's X2)			0.643	0.304	0.19
Skewness			0.1348	0.9522	0.3166
Kurtosis			-1.7264	-0.2537	-1.5804
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F			0.098	1.500	4.403
Replicate Prob(F)			0.9594	0.2646	0.0207
Treatment F			42.639	2.040	18.493
Treatment Prob(F)			0.0001	0.1525	0.0001

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type			W Weed	W Weed	W Weed
Pest Code			LOLMU	VICVI	PLALA
Pest Scientific Name	Overall		Lolium multifl>	Vicia villosa	Plantago lance>
Pest Name			Bearded ryegra>	Hairy vetch	Buckhorn plant>
Crop Code		FESAR			
BBCH Scale		BGRM			
Crop Scientific Name		Schedonorus ar>			
Crop Name		Tall fescue			
Part Rated			PLANT P	PLANT P	
Rating Date	Feb-29-2016	Feb-29-2016	Feb-29-2016	Feb-29-2016	Feb-29-2016
Rating Type	GROUND	COLOR	CONTRO	CONTRO	CONTRO
Rating Unit	%AREA	1-9	%UNCK	%UNCK	%UNCK
Number of Subsamples	1	1	1	1	1
SE Group No.	68	69	70	71	72
Days After First/Last Applic.	87 31	87 31	87 31	87 31	87 31
ARM Action Codes	L05	L05	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	71	72	73
1		AB	80.0a	7.0a	0.0
2PIPER	8oz wt/a	A			
COC	1% v/v	A			
3PIPER	4oz wt/a	A			
COC	1% v/v	A			
4PIPER	4oz wt/a	A			
SFM-75	0.5oz wt/a	A			
COC	1% v/v	A			
5PIPER	4oz wt/a	A			
GLYPHOMAX XRT(SALT)	18fl oz/a	A			
COC	1% v/v	A			
6SFM-75	0.5oz wt/a	A			
MILESTONE VM	5fl oz/a	A			
GLYPHOMAX XRT(SALT)	18fl oz/a	A			
COC	1% v/v	A			
7PIPER	8oz wt/a	B	55.0b	4.0c	72.5b
COC	1% v/v	B			50.0b
8PIPER	4oz wt/a	B	65.0b	5.0b	65.0b
COC	1% v/v	B			40.0b
9PIPER	4oz wt/a	B	5.0d	1.0f	92.8a
GLYPHOMAX XRT(SALT)	18fl oz/a	B			92.5a
COC	1% v/v	B			72.5a
10PIPER	4oz wt/a	B	27.5c	3.0d	88.8a
SFM-75	0.5oz wt/a	B			90.0a
COC	1% v/v	B			32.5b
11SFM-75	0.5oz wt/a	B	11.3d	1.8e	98.0a
MILESTONE VM	5fl oz/a	B			100.0a
GLYPHOMAX XRT(SALT)	18fl oz/a	B			17.5c
COC	1% v/v	B			
LSD P=Various			10.41	0.71	12.83
Standard Deviation			6.91	0.47	8.33
CV			17.0	12.92	9.98
Bartlett's X2			3.432	0.818	0.066
P(Bartlett's X2)			0.33	0.664	0.996
Skewness			0.0682	0.2992	-0.5449
Kurtosis			-1.6834	-1.1135	-1.2383
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F			1.594	2.215	1.129
Replicate Prob(F)			0.2326	0.1286	0.3762
Treatment F			78.066	88.291	11.349
Treatment Prob(F)			0.0001	0.0001	0.0005

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed		W Weed			
Pest Code	Spadix pecten->		Bromus inermis			
Pest Scientific Name						
Pest Name						
Crop Code			FESAR		PASNO	
BBCH Scale			BGRM		BGRM	
Crop Scientific Name			Schedonorus ar>		Paspalum notat>	
Crop Name			Tall fescue		Water couch	
Part Rated					PLANT C	
Rating Date	Feb-29-2016		Feb-29-2016		Mar-29-2016	
Rating Type	CONTRO		CONTRO		GROUND	
Rating Unit	%UNCK		%UNCK		%AREA	
Number of Subsamples	1		1		1	
SE Group No.	73		74		75	
Days After First/Last Applic.	87 31		87 31		116 60	
ARM Action Codes	EC L05E		EC L05E		L05	
Trt Treatment	Rate	Appl				
No. Name	Rate Unit	Code	76	77	78	79
1		AB	0.0	0.0	0.0	20.0a
2PIPER	8oz wt/a	A				
COC	1% v/v	A				
3PIPER	4oz wt/a	A				
COC	1% v/v	A				
4PIPER	4oz wt/a	A				
SFM-75	0.5oz wt/a	A				
COC	1% v/v	A				
5PIPER	4oz wt/a	A				
GLYPHOMAX XRT(SALT)	18fl oz/a	A				
COC	1% v/v	A				
6SFM-75	0.5oz wt/a	A				
MILESTONE VM	5fl oz/a	A				
GLYPHOMAX XRT(SALT)	18fl oz/a	A				
COC	1% v/v	A				
7PIPER	8oz wt/a	B	25.0c	40.0d	40.0bc	25.0a
COC	1% v/v	B				4.3c
8PIPER	4oz wt/a	B	20.0c	25.0e	30.0c	25.0a
COC	1% v/v	B				5.0b
9PIPER	4oz wt/a	B	100.0a	91.3a	99.0a	35.0a
GLYPHOMAX XRT(SALT)	18fl oz/a	B				3.5de
COC	1% v/v	B				
10PIPER	4oz wt/a	B	37.5b	58.8c	60.0b	35.0a
SFM-75	0.5oz wt/a	B				3.8cd
COC	1% v/v	B				
11SFM-75	0.5oz wt/a	B	100.0a	75.0b	98.5a	26.3a
MILESTONE VM	5fl oz/a	B				3.0e
GLYPHOMAX XRT(SALT)	18fl oz/a	B				
COC	1% v/v	B				
LSD P=Various			5.63	13.40	20.88	12.75
Standard Deviation			3.65	8.70	13.55	8.46
CV			6.46	14.99	20.69	30.54
Bartlett's X2			0.061	8.127	30.435	3.799
P(Bartlett's X2)			0.805	0.087	0.001*	0.579
Skewness			0.3425	-0.1076	-0.0167	0.3996
Kurtosis			-1.9644	-1.3787	-2.0802*	-0.1051
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			0.375	0.132	1.093	1.372
Replicate Prob(F)			0.7727	0.9390	0.3898	0.2893
Treatment F			485.250	37.132	22.598	2.040
Treatment Prob(F)			0.0001	0.0001	0.0001	0.1308

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed				W Weed		
Pest Code	LOLMU		Overall		VICVI		
Pest Scientific Name	Lolium multifl>				Vicia villosa		
Pest Name	Bearded ryegr>				Hairy vetch		
Crop Code				FESAR	FESAR		
BBCH Scale				BGRM	BGRM		
Crop Scientific Name				Schedonorus ar>	Schedonorus ar>		
Crop Name				Tall fescue	Tall fescue		
Part Rated	PLANT P				PLANT P		
Rating Date	Mar-29-2016	Mar-29-2016	Mar-29-2016	Mar-29-2016	Mar-29-2016		
Rating Type	CONTRO	GROUND	COLOR	CONTRO	CONTRO		
Rating Unit	%UNCK	%AREA	1-9	%UNCK	%UNCK		
Number of Subsamples	1	1	1	1	1		
SE Group No.	76	77	78	79	80		
Days After First/Last Applic.	116 60	116 60	116 60	116 60	116 60		
ARM Action Codes	EC L05E	L05	L05	EC L05E	EC L05E		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	81	82	83	84	85
1		AB	0.0	80.0a	7.0a	0.0	0.0
2PIPER	8oz wt/a	A					
COC	1% v/v	A					
3PIPER	4oz wt/a	A					
COC	1% v/v	A					
4PIPER	4oz wt/a	A					
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A					
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B	72.5b	66.3bc	5.5b	25.0c	50.0b
COC	1% v/v	B					
8PIPER	4oz wt/a	B	65.0b	72.5ab	6.0ab	13.8d	40.0b
COC	1% v/v	B					
9PIPER	4oz wt/a	B	87.8a	37.5d	1.8c	88.8a	92.5a
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B	88.8a	55.0c	5.0b	27.5c	90.0a
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B	98.0a	35.0d	2.3c	70.0b	100.0a
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various			12.18	12.14	1.00	9.03	26.76
Standard Deviation			7.90	8.06	0.67	5.86	17.37
CV			9.59	13.96	14.55	13.03	23.31
Bartlett's X2			0.224	9.377	1.62	0.873	4.19
P(Bartlett's X2)			0.974	0.052	0.445	0.928	0.242
Skewness			-0.3745	-0.6643	-0.6486	0.4703	-0.8536
Kurtosis			-1.3273	-0.5381	-0.9528	-1.4605	-0.9197
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			2.811	2.027	1.375	2.424	1.166
Replicate Prob(F)			0.0846	0.1534	0.2886	0.1163	0.3633
Treatment F			11.414	21.193	40.200	122.818	9.961
Treatment Prob(F)			0.0005	0.0001	0.0001	0.0001	0.0009

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	Overall		
Pest Code	PLALA	Spadix pecten->	Bromus inermis	LOLMU			
Pest Scientific Name	Plantago lance->			Lolium multifl->			
Pest Name	Buckhorn plant->			Bearded ryegra->			
Crop Code							
BBCH Scale							
Crop Scientific Name							
Crop Name							
Part Rated							
Rating Date	Mar-29-2016	Mar-29-2016	Mar-29-2016	PLANT P Apr-28-2016	Apr-28-2016		
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	GROUND		
Rating Unit	%UNCK	%UNCK	%UNCK	%UNCK	%AREA		
Number of Subsamples	1	1	1	1	1		
SE Group No.	81	82	83	76	77		
Days After First/Last Applic.	116 60	116 60	116 60	146 90	146 90		
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	L05		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	86	87	88	89	90
1		AB	0.0	0.0	0.0	0.0	80.0a
2PIPER	8oz wt/a	A					
COC	1% v/v	A					
3PIPER	4oz wt/a	A					
COC	1% v/v	A					
4PIPER	4oz wt/a	A					
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A					
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B	6.3c	25.0b	40.0bc	72.5b	70.0bc
COC	1% v/v	B					
8PIPER	4oz wt/a	B	6.3c	20.0c	30.0c	65.0b	73.8ab
COC	1% v/v	B					
9PIPER	4oz wt/a	B	75.0a	100.0a	99.0a	92.8a	55.0e
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B	12.5c	97.5a	60.0b	88.8a	65.0cd
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B	50.0b	100.0a	98.5a	98.0a	60.0de
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various			10.73	3.98	20.88	12.83	6.63
Standard Deviation			6.97	2.58	13.55	8.33	4.40
CV			23.22	3.77	20.69	9.98	6.54
Bartlett's X2			10.711	1.317	30.435	0.066	5.514
P(Bartlett's X2)			0.03*	0.251	0.001*	0.996	0.063
Skewness			0.7979	-0.4541	-0.0167	-0.5449	-0.7757
Kurtosis			-0.8852	-1.9741	-2.0802*	-1.2383	1.4934
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			1.579	2.250	1.093	1.129	1.344
Replicate Prob(F)			0.2457	0.1349	0.3898	0.3762	0.2976
Treatment F			79.506	1060.500	22.598	11.349	17.344
Treatment Prob(F)			0.0001	0.0001	0.0001	0.0005	0.0001

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type			W Weed	W Weed	W Weed		
Pest Code			VICVI	PLALA			
Pest Scientific Name			Vicia villosa	Plantago lance>	Spadix pecten->		
Pest Name			Hairy vetch	Buckhorn plant>			
Crop Code	FESAR	FESAR					
BBCH Scale	BGRM	BGRM					
Crop Scientific Name	Schedonorus ar>	Schedonorus ar>					
Crop Name	Tall fescue	Tall fescue					
Part Rated			PLANT P				
Rating Date	Apr-28-2016	Apr-28-2016	Apr-28-2016	Apr-28-2016	Apr-28-2016		
Rating Type	COLOR	CONTRO	CONTRO	CONTRO	CONTRO		
Rating Unit	1-9	%UNCK	%UNCK	%UNCK	%UNCK		
Number of Subsamples	1	1	1	1	1		
SE Group No.	78	79	80	81	82		
Days After First/Last Applic.	146 90	146 90	146 90	146 90	146 90		
ARM Action Codes	L05	EC L05E	EC L05E	EC L05E	EC L05E		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	91	92	93		
1		AB	7.0a	0.0	0.0		
2PIPER	8oz wt/a	A					
COC	1% v/v	A					
3PIPER	4oz wt/a	A					
COC	1% v/v	A					
4PIPER	4oz wt/a	A					
SFM-75	0.5oz wt/a	A					
COC	1% v/v	A					
5PIPER	4oz wt/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
6SFM-75	0.5oz wt/a	A					
MILESTONE VM	5fl oz/a	A					
GLYPHOMAX XRT(SALT)	18fl oz/a	A					
COC	1% v/v	A					
7PIPER	8oz wt/a	B	7.0a	25.0c	50.0b		
COC	1% v/v	B					
8PIPER	4oz wt/a	B	7.0a	13.8d	56.3b		
COC	1% v/v	B					
9PIPER	4oz wt/a	B	6.0b	88.8a	92.5a		
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
10PIPER	4oz wt/a	B	7.0a	27.5c	90.0a		
SFM-75	0.5oz wt/a	B					
COC	1% v/v	B					
11SFM-75	0.5oz wt/a	B	6.0b	70.0b	100.0a		
MILESTONE VM	5fl oz/a	B					
GLYPHOMAX XRT(SALT)	18fl oz/a	B					
COC	1% v/v	B					
LSD P=Various				9.03	29.23	10.92	8.95
Standard Deviation	0.00			5.86	18.97	7.09	5.81
CV	0.0			13.03	24.4	25.31	9.25
Bartlett's X2	0.0			0.873	6.293	11.647	9.137
P(Bartlett's X2)				0.928	0.098	0.009*	0.028*
Skewness	-0.7551			0.4703	-1.1414*	0.8257	-0.4795
Kurtosis	-1.5682			-1.4605	-0.1565	-0.8429	-1.9066
Mean Sep. Test	LSD.05			LSD.05	LSD.05	LSD.05	LSD.05
Replicate F	0.000			2.424	2.059	2.058	1.154
Replicate Prob(F)	1.0000			0.1163	0.1593	0.1594	0.3672
Treatment F	0.000			122.818	5.819	78.461	275.832
Treatment Prob(F)	1.0000			0.0001	0.0077	0.0001	0.0001

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed		W Weed		Overall			
Pest Code	Bromus inermis		Lolium multiflora					
Pest Scientific Name	Bromus inermis		Lolium multiflora					
Pest Name	Bromus inermis		Lolium multiflora					
Crop Code	PASNO		PASNO					
BBCH Scale	BGRM		BGRM					
Crop Scientific Name	Paspalum notatum		Paspalum notatum					
Crop Name	Water couch		Water couch					
Part Rated	PLANT C		PLANT C					
Rating Date	Apr-28-2016	Apr-28-2016	Apr-28-2016	May-27-2016	May-27-2016			
Rating Type	CONTRO	COLOR	GROUND	CONTRO	GROUND			
Rating Unit	%UNCK	1-9	%AREA	%UNCK	%AREA			
Number of Subsamples	1	1	1	1	1			
SE Group No.	83	87	89	90	91			
Days After First/Last Applic.	146 90	146 90	146 90	175 119	175 119			
ARM Action Codes	EC L05E	L05	L05	EC L05E	L05			
Trt No.	Treatment Name	Rate	Appl Code	96	97	98	99	100
1			AB	0.0	6.0a	20.0b	0.0	71.3a
2	PIPER	8oz wt/a	A					
	COC	1% v/v	A					
3	PIPER	4oz wt/a	A					
	COC	1% v/v	A					
4	PIPER	4oz wt/a	A					
	SFM-75	0.5oz wt/a	A					
	COC	1% v/v	A					
5	PIPER	4oz wt/a	A					
	GLYPHOMAX XRT(SALT)	18fl oz/a	A					
	COC	1% v/v	A					
6	SFM-75	0.5oz wt/a	A					
	MILESTONE VM	5fl oz/a	A					
	GLYPHOMAX XRT(SALT)	18fl oz/a	A					
	COC	1% v/v	A					
7	PIPER	8oz wt/a	B	80.0ab	5.5a	25.0b	72.5b	70.0a
	COC	1% v/v	B					
8	PIPER	4oz wt/a	B	32.5c	6.0a	25.0b	65.0b	71.3a
	COC	1% v/v	B					
9	PIPER	4oz wt/a	B	98.5a	4.0b	45.0a	92.8a	55.0c
	GLYPHOMAX XRT(SALT)	18fl oz/a	B					
	COC	1% v/v	B					
10	PIPER	4oz wt/a	B	60.0b	4.0b	41.3a	88.8a	65.0ab
	SFM-75	0.5oz wt/a	B					
	COC	1% v/v	B					
11	SFM-75	0.5oz wt/a	B	98.5a	3.5b	45.0a	98.0a	60.0bc
	MILESTONE VM	5fl oz/a	B					
	GLYPHOMAX XRT(SALT)	18fl oz/a	B					
	COC	1% v/v	B					
LSD P=Various				20.18	0.67	16.04	12.83	7.28
Standard Deviation				13.10	0.45	10.64	8.33	4.83
CV				17.73	9.25	31.73	9.98	7.38
Bartlett's X2				33.56	0.85	7.418	0.066	8.138
P(Bartlett's X2)				0.001*	0.357	0.191	0.996	0.043*
Skewness				-0.746	-0.0402	0.5453	-0.5449	-1.668*
Kurtosis				-1.2527	-1.7591	-0.9664	-1.2383	4.4974*
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				1.207	1.667	3.001	1.129	0.536
Replicate Prob(F)				0.3492	0.2166	0.0637	0.3762	0.6649
Treatment F				18.380	25.333	4.600	11.349	7.786
Treatment Prob(F)				0.0001	0.0001	0.0096	0.0005	0.0009

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type			W Weed	W Weed	W Weed
Pest Code			VICVI	PLALA	
Pest Scientific Name			Vicia villosa	Plantago lance>	Spadix pecten->
Pest Name			Hairy vetch	Buckhorn plant>	
Crop Code	FESAR	FESAR			
BBCH Scale	BGRM	BGRM			
Crop Scientific Name	Schedonorus ar>	Schedonorus ar>			
Crop Name	Tall fescue	Tall fescue			
Part Rated			PLANT P		
Rating Date	May-27-2016	May-27-2016	May-27-2016	May-27-2016	May-27-2016
Rating Type	COLOR	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	1-9	%UNCK	%UNCK	%UNCK	%UNCK
Number of Subsamples	1	1	1	1	1
SE Group No.	92	93	94	95	96
Days After First/Last Applic.	175 119	175 119	175 119	175 119	175 119
ARM Action Codes	L05	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	101	102	103
1		AB	7.0a	0.0	0.0
2PIPER	8oz wt/a	A			
COC	1% v/v	A			
3PIPER	4oz wt/a	A			
COC	1% v/v	A			
4PIPER	4oz wt/a	A			
SFM-75	0.5oz wt/a	A			
COC	1% v/v	A			
5PIPER	4oz wt/a	A			
GLYPHOMAX XRT(SALT)	18fl oz/a	A			
COC	1% v/v	A			
6SFM-75	0.5oz wt/a	A			
MILESTONE VM	5fl oz/a	A			
GLYPHOMAX XRT(SALT)	18fl oz/a	A			
COC	1% v/v	A			
7PIPER	8oz wt/a	B	7.0a	25.0c	50.0b
COC	1% v/v	B			
8PIPER	4oz wt/a	B	7.0a	13.8d	40.0b
COC	1% v/v	B			
9PIPER	4oz wt/a	B	6.5b	88.8a	91.3a
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
10PIPER	4oz wt/a	B	7.0a	27.5c	90.0a
SFM-75	0.5oz wt/a	B			
COC	1% v/v	B			
11SFM-75	0.5oz wt/a	B	6.5b	70.0b	100.0a
MILESTONE VM	5fl oz/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
LSD P=Various			0.45	9.03	26.37
Standard Deviation			0.30	5.86	17.11
CV			4.36	13.03	23.05
Bartlett's X2			0.0	0.873	4.709
P(Bartlett's X2)			.	0.928	0.194
Skewness			-1.9104*	0.4703	-0.8616
Kurtosis			1.7922	-1.4605	-0.906
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F			2.500	2.424	1.256
Replicate Prob(F)			0.0991	0.1163	0.3332
Treatment F			3.000	122.818	10.110
Treatment Prob(F)			0.0450	0.0001	0.0008

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

				W Weed				
				Bromus inermis				
				CYNDA	PASNO	PASNO	PASNO	PASNO
				BGRM	BGRM	BGRM	BGRM	BGRM
				Cynodon dactyl>	Paspalum notat>	Paspalum notat>	Paspalum notat>	Paspalum notat>
				Dog's-tooth gr>	Water couch	Water couch	Water couch	Water couch
				PLANT C	PLANT C	PLANT C	PLANT C	PLANT C
				May-27-2016	May-27-2016	May-27-2016	May-27-2016	Jun-1-2016
				CONTRO	GROUND	COLOR	GROUND	COLOR
				%UNCK	%AREA	1-9	%AREA	1-9
				1	1	1	1	1
				97	99	98	99	100
				175 119	175 119	175 119	175 119	180 124
				EC L05E	L05	L05	L05	L05
Trt No.	Treatment Name	Rate	Appl Code	106	107	108	109	110
		Rate Unit						
1			AB	0.0	13.8a	6.0a	20.0c	6.0a
2	PIPER	8oz wt/a	A					6.0a
	COC	1% v/v	A					
3	PIPER	4oz wt/a	A					6.0a
	COC	1% v/v	A					
4	PIPER	4oz wt/a	A					5.8a
	SFM-75	0.5oz wt/a	A					
	COC	1% v/v	A					
5	PIPER	4oz wt/a	A					5.5a
	GLYPHOMAX XRT(SALT)	18fl oz/a	A					
	COC	1% v/v	A					
6	SFM-75	0.5oz wt/a	A					5.8a
	MILESTONE VM	5fl oz/a	A					
	GLYPHOMAX XRT(SALT)	18fl oz/a	A					
	COC	1% v/v	A					
7	PIPER	8oz wt/a	B	80.0a	10.0a	6.0a	26.3bc	
	COC	1% v/v	B					
8	PIPER	4oz wt/a	B	32.5c	12.5a	6.0a	25.0c	
	COC	1% v/v	B					
9	PIPER	4oz wt/a	B	97.3a	13.8a	5.8ab	45.0a	
	GLYPHOMAX XRT(SALT)	18fl oz/a	B					
	COC	1% v/v	B					
10	PIPER	4oz wt/a	B	57.5b	6.3a	5.5ab	41.3ab	
	SFM-75	0.5oz wt/a	B					
	COC	1% v/v	B					
11	SFM-75	0.5oz wt/a	B	98.5a	20.0a	5.3b	45.0a	
	MILESTONE VM	5fl oz/a	B					
	GLYPHOMAX XRT(SALT)	18fl oz/a	B					
	COC	1% v/v	B					
LSD P=Various				21.73	12.12	0.50	15.57	0.57
Standard Deviation				14.11	8.04	0.33	10.33	0.38
CV				19.28	63.27	5.8	30.6	6.52
Bartlett's X2				32.634	6.063	0.083	8.283	0.083
P(Bartlett's X2)				0.001*	0.30	0.959	0.141	0.959
Skewness				-0.7535	1.0679*	-1.2332*	0.5435	-1.9104*
Kurtosis				-1.2843	-0.303	-0.531	-0.7922	1.7922
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				1.294	2.895	2.500	3.398	0.769
Replicate Prob(F)				0.3215	0.0699	0.0991	0.0456	0.5289
Treatment F				15.921	1.292	3.600	4.734	1.154
Treatment Prob(F)				0.0001	0.3186	0.0244	0.0085	0.3759

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type				W Weed	
Pest Code					
Pest Scientific Name		Overall		Bromus inermis	
Pest Name					
Crop Code	PASNO			CYND	CYND
BBCH Scale	BGRM			BGRM	BGRM
Crop Scientific Name	Paspalum notat>			Cynodon dactyl>	Cynodon dactyl>
Crop Name	Water couch			Dog's-tooth gr>	Dog's-tooth gr>
Part Rated	PLANT C			PLANT C	PLANT C
Rating Date	Jun-1-2016	Jun-1-2016	Jun-1-2016	Jun-1-2016	Jun-27-2016
Rating Type	GROUND	GROUND	GROUND	CONTRO	GROUND
Rating Unit	%AREA	%AREA	%AREA	%UNCK	%AREA
Number of Subsamples	1	1	1	1	1
SE Group No.	101	102	103	104	105
Days After First/Last Applic.	180 124	180 124	180 124	180 124	206 150
ARM Action Codes	L05	L05	L05	EC L05E	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	111	112	113
1		AB	27.5a	75.0a	25.0a
2PIPER	8oz wt/a	A	27.5a	72.5ab	20.0a
COC	1% v/v	A			78.3a
3PIPER	4oz wt/a	A	30.0a	71.3ab	17.5a
COC	1% v/v	A			55.0a
4PIPER	4oz wt/a	A	35.0a	66.3b	12.5a
SFM-75	0.5oz wt/a	A			78.3a
COC	1% v/v	A			
5PIPER	4oz wt/a	A	22.5a	66.3b	35.0a
GLYPHOMAX XRT(SALT)	18fl oz/a	A			87.5a
COC	1% v/v	A			
6SFM-75	0.5oz wt/a	A	27.5a	66.3b	32.5a
MILESTONE VM	5fl oz/a	A			81.3a
GLYPHOMAX XRT(SALT)	18fl oz/a	A			
COC	1% v/v	A			
7PIPER	8oz wt/a	B			
COC	1% v/v	B			13.8a
8PIPER	4oz wt/a	B			
COC	1% v/v	B			13.8a
9PIPER	4oz wt/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			20.0a
COC	1% v/v	B			
10PIPER	4oz wt/a	B			
SFM-75	0.5oz wt/a	B			8.8a
COC	1% v/v	B			
11SFM-75	0.5oz wt/a	B			
MILESTONE VM	5fl oz/a	B			20.0a
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
LSD P=Various			14.03	6.69	16.72
Standard Deviation			9.31	4.44	11.09
CV			32.86	6.38	46.71
Bartlett's X2			4.382	1.85	11.409
P(Bartlett's X2)			0.496	0.87	0.044*
Skewness			-0.0137	0.1772	1.5251*
Kurtosis			-1.1486	0.4398	1.681
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F			1.154	1.761	4.278
Replicate Prob(F)			0.3598	0.1978	0.0227
Treatment F			0.769	3.000	2.499
Treatment Prob(F)			0.5863	0.0450	0.0775
					0.3498
					0.1367

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type					Overall			
Pest Code								
Pest Scientific Name								
Pest Name								
Crop Code	PASNO	PASNO				CYNDA	PASNO	
BBCH Scale	BGRM	BGRM				BGRM	BGRM	
Crop Scientific Name	Paspalum notat>	Paspalum notat>				Cynodon dactyl>	Paspalum notat>	
Crop Name	Water couch	Water couch				Dog's-tooth gr>	Water couch	
Part Rated	PLANT C	PLANT C				PLANT C	PLANT C	
Rating Date	Jun-27-2016	Jun-27-2016			Jun-27-2016	Jul-27-2016	Jul-27-2016	
Rating Type	COLOR	GROUND			GROUND	GROUND	GROUND	
Rating Unit	1-9	%AREA			%AREA	%AREA	%AREA	
Number of Subsamples	1	1			1	1	1	
SE Group No.	106	107			108	109	110	
Days After First/Last Applic.	206 150	206 150			206 150	236 180	236 180	
ARM Action Codes	L05	L05			L05	L05	L05	
Trt No.	Treatment Name	Rate	Appl Code	116	117	118	119	120
1			AB	6.0a	32.5a	70.0a	33.8a	37.5a
2	PIPER COC	8oz wt/a 1% v/v	A A					
3	PIPER COC	4oz wt/a 1% v/v	A A					
4	PIPER SFM-75 COC	4oz wt/a 0.5oz wt/a 1% v/v	A A A					
5	PIPER GLYPHOMAX XRT(SALT) COC	4oz wt/a 18fl oz/a 1% v/v	A A A					
6	SFM-75 MILESTONE VM GLYPHOMAX XRT(SALT) COC	0.5oz wt/a 5fl oz/a 18fl oz/a 1% v/v	A A A A					
7	PIPER COC	8oz wt/a 1% v/v	B B	6.0a	41.3a	70.0a	11.3a	63.8a
8	PIPER COC	4oz wt/a 1% v/v	B B	6.0a	30.0a	68.8ab	18.8a	47.5a
9	PIPER GLYPHOMAX XRT(SALT) COC	4oz wt/a 18fl oz/a 1% v/v	B B B	6.0a	45.0a	66.3bc	20.0a	52.5a
10	PIPER SFM-75 COC	4oz wt/a 0.5oz wt/a 1% v/v	B B B	6.0a	48.8a	65.0c	8.8a	58.8a
11	SFM-75 MILESTONE VM GLYPHOMAX XRT(SALT) COC	0.5oz wt/a 5fl oz/a 18fl oz/a 1% v/v	B B B B	6.0a	47.5a	67.5abc	20.0a	51.3a
LSD P=Various					19.95	3.37	18.98	21.27
Standard Deviation				0.00	13.24	2.24	12.59	14.11
CV				0.0	32.42	3.29	67.17	27.2
Bartlett's X2				0.0	3.782	1.021	8.133	7.577
P(Bartlett's X2)				.	0.581	0.796	0.149	0.181
Skewness				.	-0.3083	-1.0672*	1.2757*	-1.4553*
Kurtosis				.	-0.888	0.2953	0.9753	1.3452
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				0.000	2.964	2.500	3.459	1.414
Replicate Prob(F)				1.0000	0.0658	0.0991	0.0434	0.2775
Treatment F				0.000	1.422	3.333	1.939	1.667
Treatment Prob(F)				1.0000	0.2727	0.0319	0.1472	0.2032

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type		W Weed			
Pest Code		DIGAD			
Pest Scientific Name	Overall	Digitaria cili>			
Pest Name		Henry crabgrass			
Crop Code			CYNDA	PASNO	PASNO
BBCH Scale			BGRM	BGRM	BGRM
Crop Scientific Name			Cynodon dactyl>	Paspalum notat>	Paspalum notat>
Crop Name			Dog's-tooth gr>	Water couch	Water couch
Part Rated			PLANT C	PLANT C	PLANT C
Rating Date	Jul-27-2016	Jul-27-2016	Jul-1-2016	Jul-1-2016	Jul-1-2016
Rating Type	GROUND	GROUND	GROUND	COLOR	GROUND
Rating Unit	%AREA	%AREA	%AREA	1-9	%AREA
Number of Subsamples	1	1	1	1	1
SE Group No.	111	112	113	115	114
Days After First/Last Applic.	236 180	236 180	210 154	210 154	210 154
ARM Action Codes	L05	L05	L05	L05	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	121	122	123
1		AB	75.0a	2.0a	31.3a
2PIPER	8oz wt/a	A			25.0a
COC	1% v/v	A			6.0a
3PIPER	4oz wt/a	A			17.5a
COC	1% v/v	A			6.0a
4PIPER	4oz wt/a	A			15.0a
SFM-75	0.5oz wt/a	A			
COC	1% v/v	A			6.0a
5PIPER	4oz wt/a	A			35.0a
GLYPHOMAX XRT(SALT)	18fl oz/a	A			
COC	1% v/v	A			6.0a
6SFM-75	0.5oz wt/a	A			32.5a
MILESTONE VM	5fl oz/a	A			
GLYPHOMAX XRT(SALT)	18fl oz/a	A			
COC	1% v/v	A			6.0a
7PIPER	8oz wt/a	B	73.8a	2.5a	
COC	1% v/v	B			
8PIPER	4oz wt/a	B	70.0a	2.0a	
COC	1% v/v	B			
9PIPER	4oz wt/a	B	72.5a	4.0a	
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
10PIPER	4oz wt/a	B	73.8a	4.0a	
SFM-75	0.5oz wt/a	B			
COC	1% v/v	B			
11SFM-75	0.5oz wt/a	B	72.5a	5.3a	
MILESTONE VM	5fl oz/a	B			
GLYPHOMAX XRT(SALT)	18fl oz/a	B			
COC	1% v/v	B			
LSD P=Various			5.50	3.11	18.14
Standard Deviation			3.65	2.06	12.04
CV			5.01	62.73	46.23
Bartlett's X2			0.859	2.456	9.65
P(Bartlett's X2)			0.93	0.783	0.086
Skewness			0.6681	0.7285	1.0421*
Kurtosis			-1.1638	0.6079	-0.2009
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F			7.188	2.798	7.808
Replicate Prob(F)			0.0032	0.0760	0.0023
Treatment F			0.875	1.651	1.905
Treatment Prob(F)			0.5208	0.2069	0.1532

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type				
Pest Code				
Pest Scientific Name				Overall
Pest Name				
Crop Code				
BBCH Scale				
Crop Scientific Name				
Crop Name				
Part Rated				
Rating Date				Jul-1-2016
Rating Type				GROUND
Rating Unit				%AREA
Number of Subsamples				1
SE Group No.				116
Days After First/Last Applic.				210 154
ARM Action Codes				L05
Trt No.	Treatment Name	Rate	Appl Code	
		Rate Unit		126
1			AB	70.0a
2	PIPER	8oz wt/a	A	71.3a
	COC	1% v/v	A	
3	PIPER	4oz wt/a	A	71.3a
	COC	1% v/v	A	
4	PIPER	4oz wt/a	A	70.0a
	SFM-75	0.5oz wt/a	A	
	COC	1% v/v	A	
5	PIPER	4oz wt/a	A	70.0a
	GLYPHOMAX XRT(SALT)	18fl oz/a	A	
	COC	1% v/v	A	
6	SFM-75	0.5oz wt/a	A	68.8a
	MILESTONE VM	5fl oz/a	A	
	GLYPHOMAX XRT(SALT)	18fl oz/a	A	
	COC	1% v/v	A	
7	PIPER	8oz wt/a	B	
	COC	1% v/v	B	
8	PIPER	4oz wt/a	B	
	COC	1% v/v	B	
9	PIPER	4oz wt/a	B	
	GLYPHOMAX XRT(SALT)	18fl oz/a	B	
	COC	1% v/v	B	
10	PIPER	4oz wt/a	B	
	SFM-75	0.5oz wt/a	B	
	COC	1% v/v	B	
11	SFM-75	0.5oz wt/a	B	
	MILESTONE VM	5fl oz/a	B	
	GLYPHOMAX XRT(SALT)	18fl oz/a	B	
	COC	1% v/v	B	
LSD P=Various				2.84
Standard Deviation				1.88
CV				2.68
Bartlett's X2				0.0
P(Bartlett's X2)				.
Skewness				0.6462
Kurtosis				6.3412*
Mean Sep. Test				LSD.05
Replicate F				0.294
Replicate Prob(F)				0.8290
Treatment F				1.000
Treatment Prob(F)				0.4509

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 97. Tall fescue (*Schedonorus arundinaceus*) color (1-9 scale) through 5 Months after Application 1 (MAT).

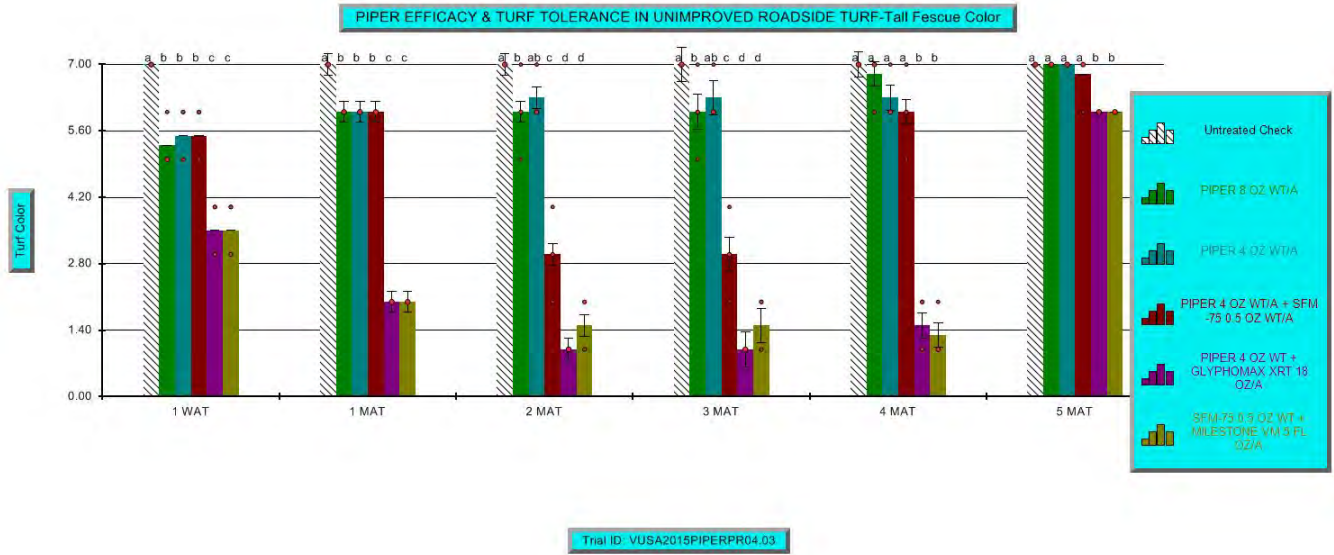
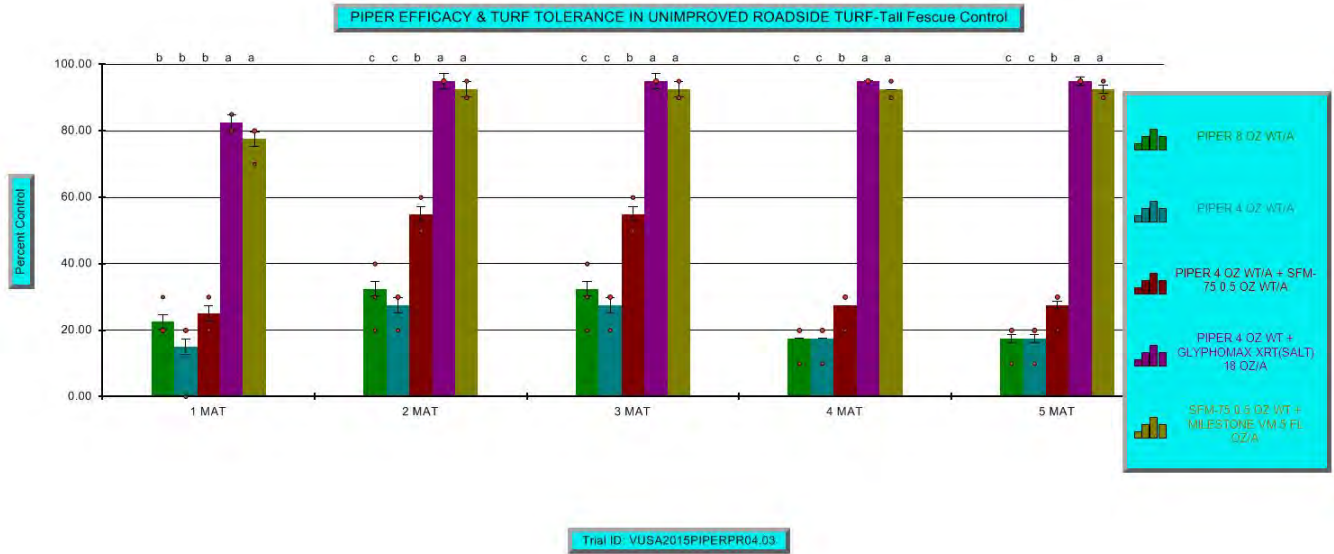
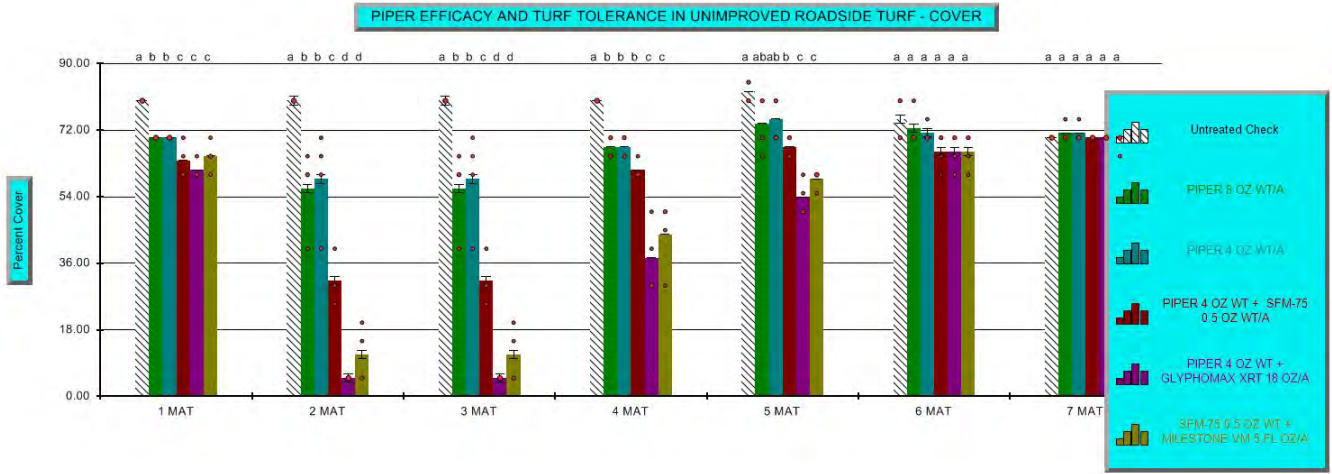


Chart 98. Tall fescue (*Schedonorus arundinaceus*) control (damage) through 5 Months after Application 1 (MAT).



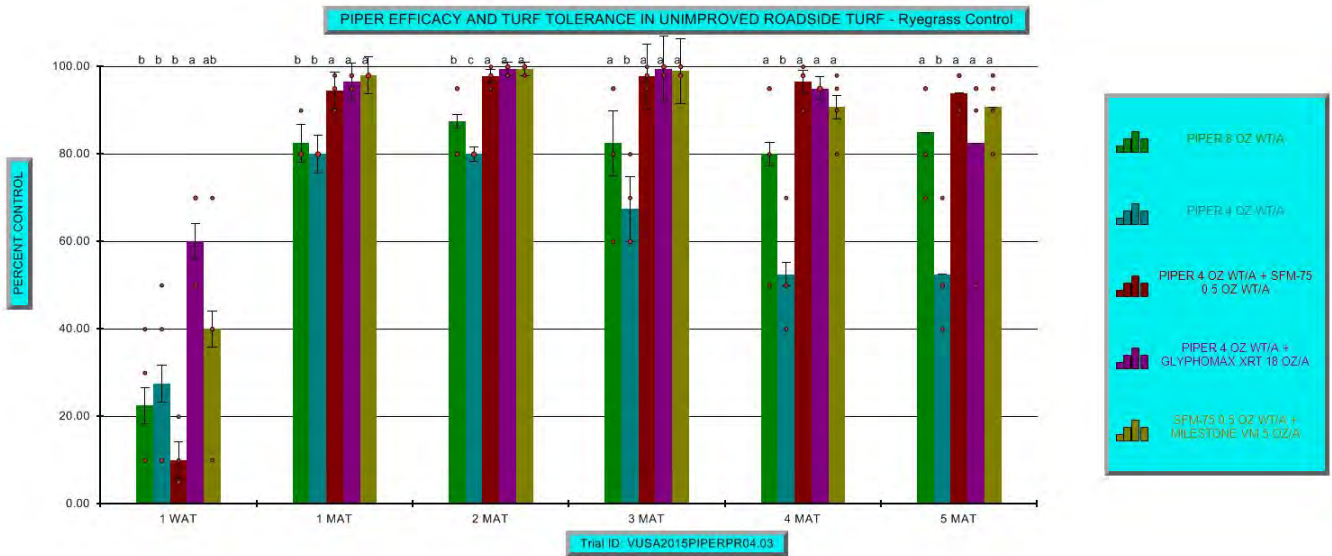
PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 99. Overall average percent cover at 1, 2, 3, 4, 5, 6, and 7 Months after Application A (MAT).



Trial ID: VUSA2015PIPERPR04.03

Chart 100. Annual ryegrass (*Lolium multiflorum*) control through 5 Months after Application A (MAT).



Trial ID: VUSA2015PIPERPR04.03

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 101. Smooth bromegrass (*Bromus inermis*) control at 3, 4, 5, and 6 Months after Application A (MAT).

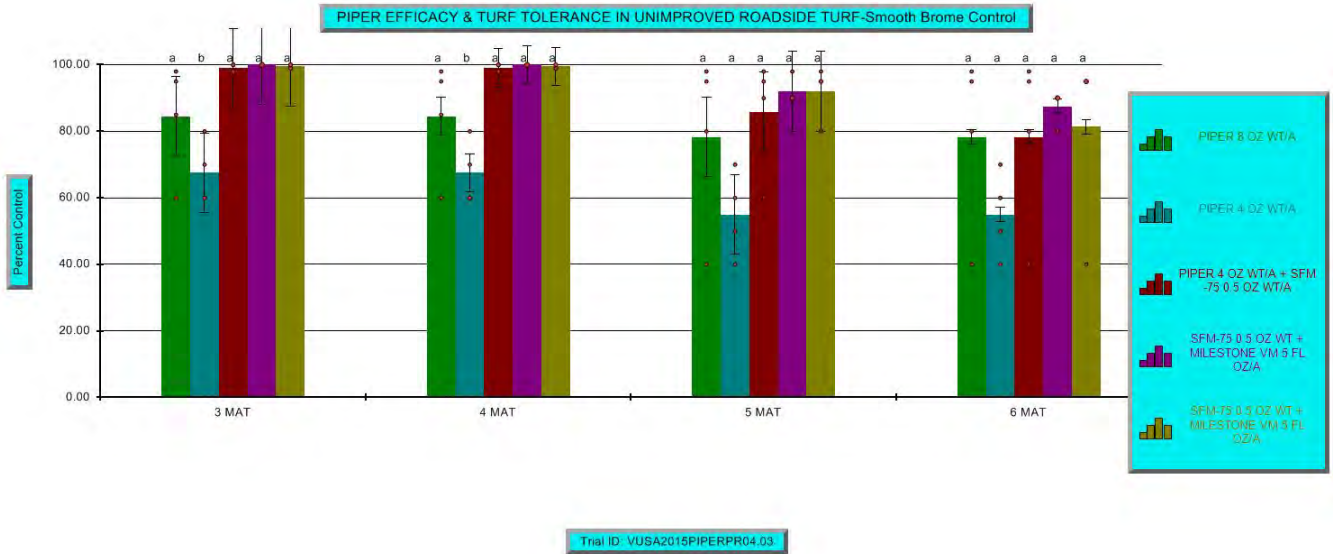
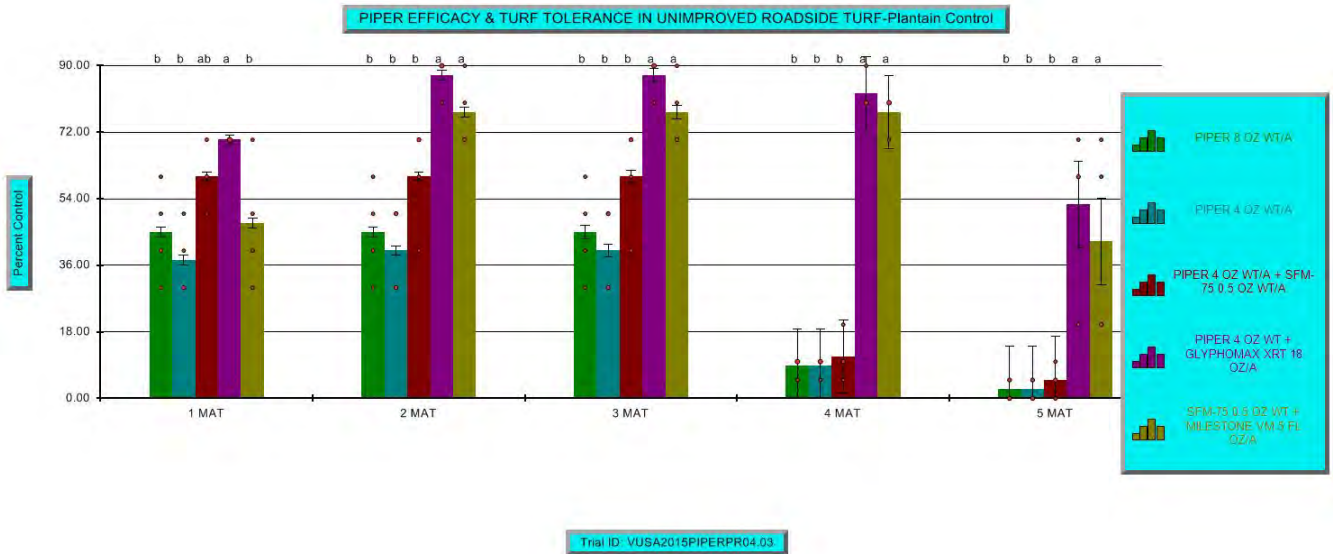
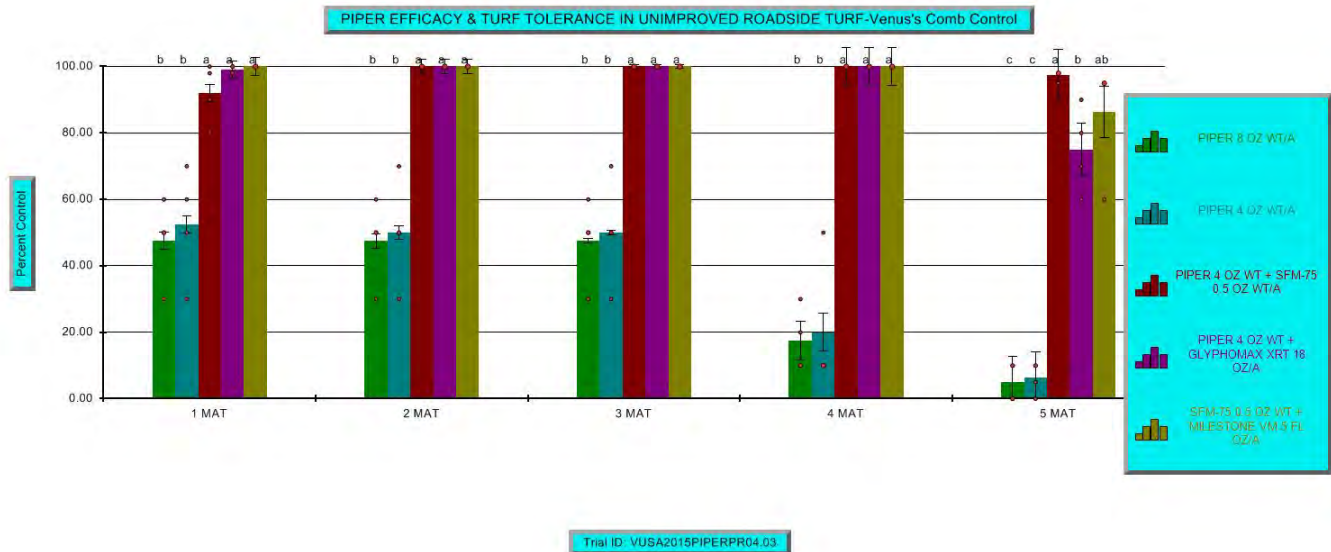


Chart 102. Buckhorn plantain (*Plantago lanceolata*) control at 1, 2, 3, 4, and 5 Months after Application A (MAT).



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 103. Venus's Comb (*Scandix pecten-veneris*) control at 1, 2, 3, 4, and 5 Months after Application A (MAT).



Pest Type

W, Weed, G-BYRW7, G-WedStg = Weed or volunteer crop

Pest Code

LOLMU, *Lolium multiflorum*, = US

PLALA, *Plantago lanceolata*, = US

VICVI, *Vicia villosa*, = US

Spadix pecten-veneris, = *Spadix pecten-veneris*,

Bromus inermis, = *Bromus inermis*,

DIGAD, *Digitaria ciliaris*, = US

Crop Code

PASNO, BGRM, *Paspalum notatum*, = US

FESAR, BGRM, *Schedonorus arundinaceus*, = US

CYNDA, BGRM, *Cynodon dactylon*, = US

Part Rated

PLANT = plant

P = Pest is Part Rated

C = Crop is Part Rated

Rating Type

GROUND = groundcover

COLOR = color

CONTRO = control / burndown or knockdown

Rating Unit

%AREA = percent of area

1-9 = 1-9 index/scale

%UNCK = percent of untreated check

ARM Action Codes

L05 = Perform 5% Least Significant Difference mean separation on Standardized Summary.

EC = Do not analyze untreated check, while still reporting treatment mean on AOV Means Table.

L05E = Perform 5% Least Significant Difference mean separation on Standardized Summary, and exclude untreated treatments from AOV.

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 104. Bahiagrass (*Paspalum notatum*) color (1-9 Scale) at 2, 3, 4, and 5 Months after Application B (MAT).

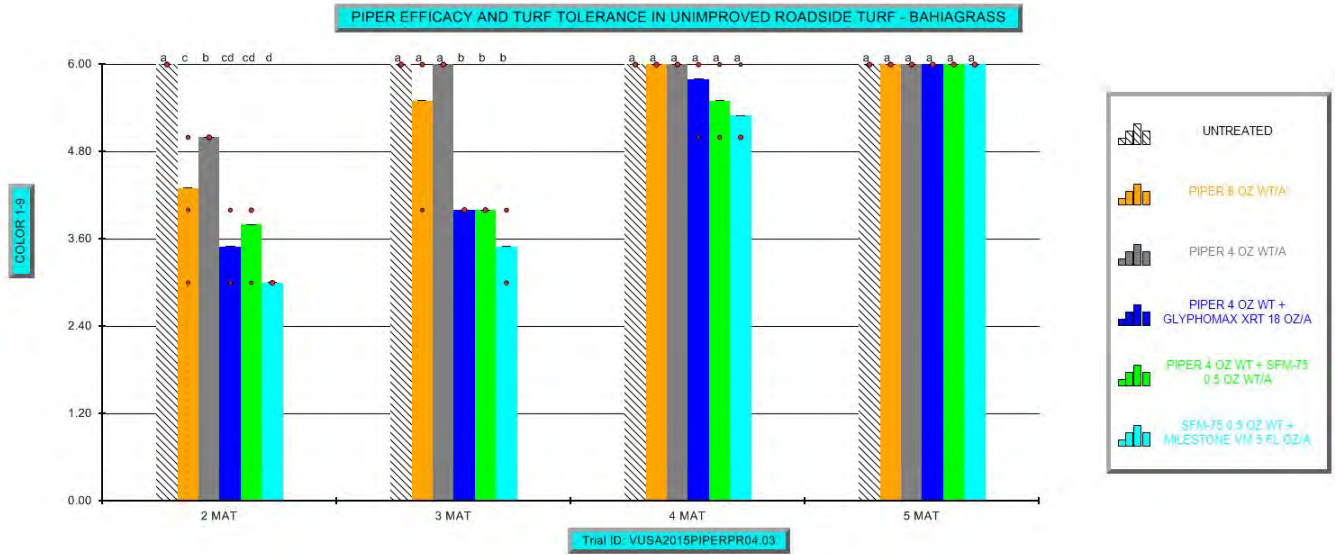
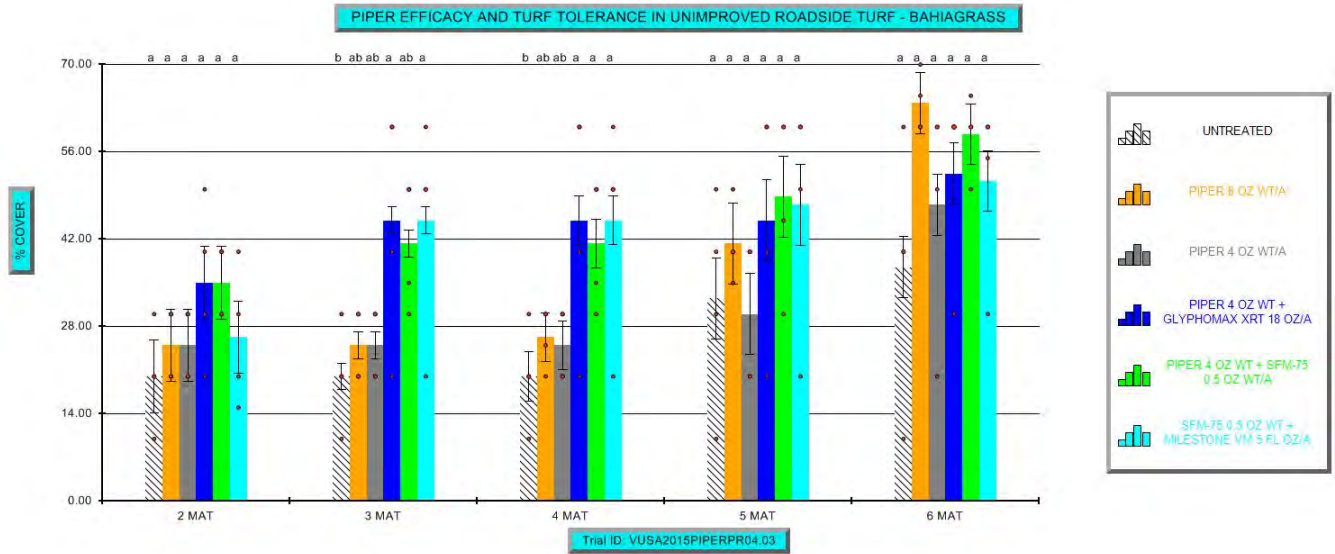


Chart 105. Bahiagrass (*Paspalum notatum*) cover at 2, 3, 4, 5, and 6 Months after Application B (MAT).



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 106. Bermudagrass (*Cynodon dactylon*) cover at 4, 5, and 6 Months after Application B (MAT).

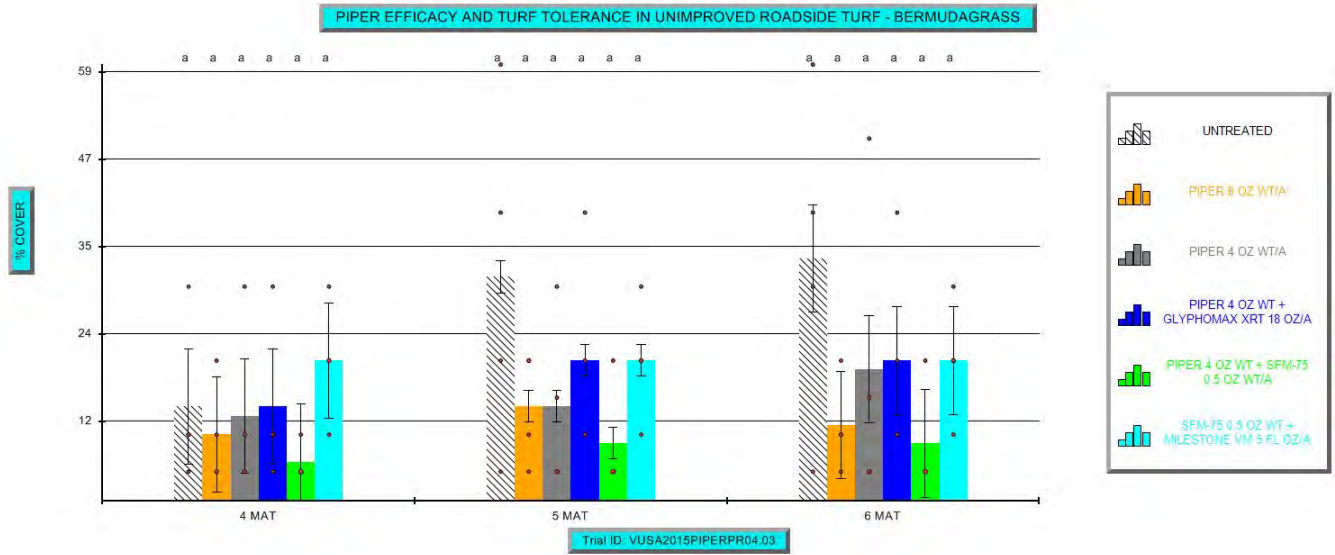
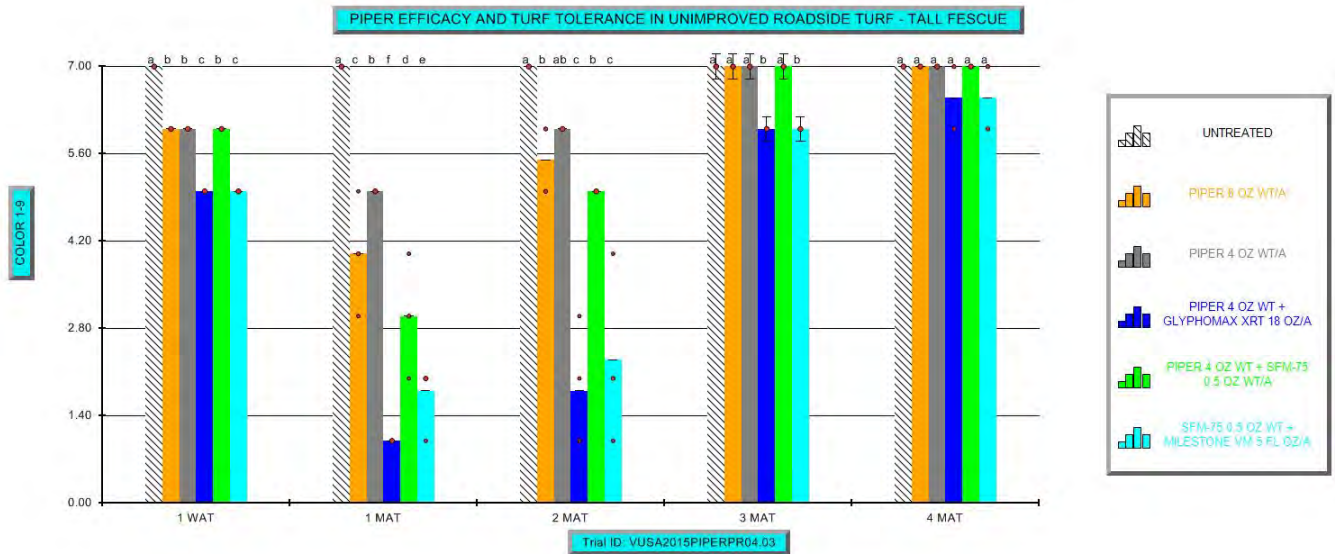


Chart 107. Tall fescue (*Schedonorus arundinaceus*) color (1-9 scale) through 4 Months after Application B (MAT).



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 108. Tall fescue (*Schedonorus arundinaceus*) control (damage) through 4 Months after Application B (MAT).

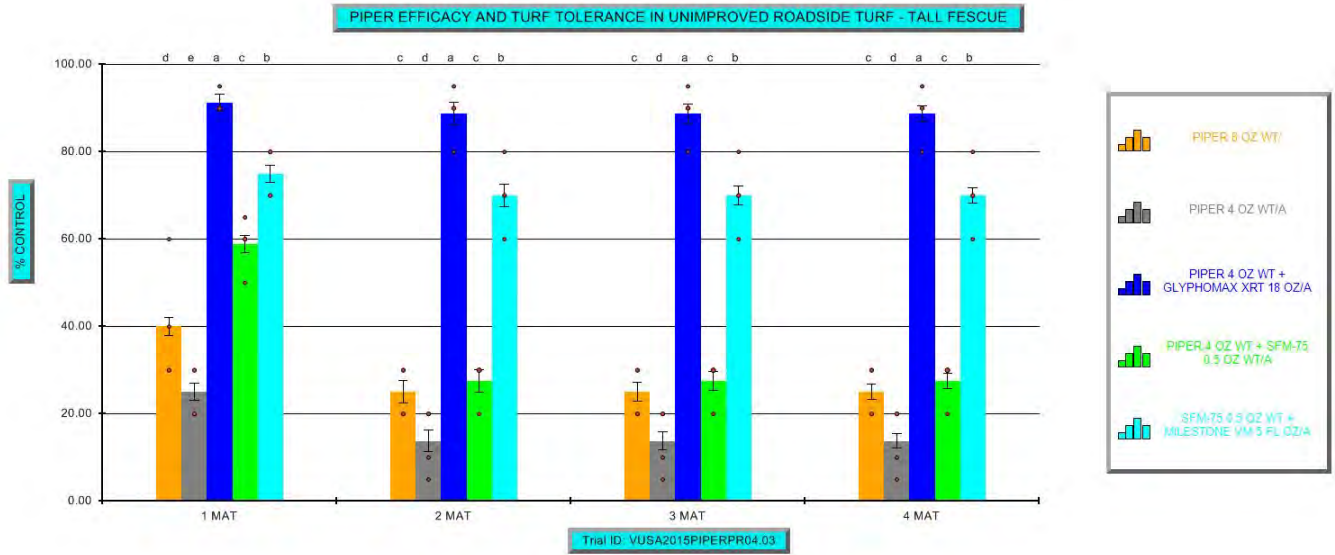
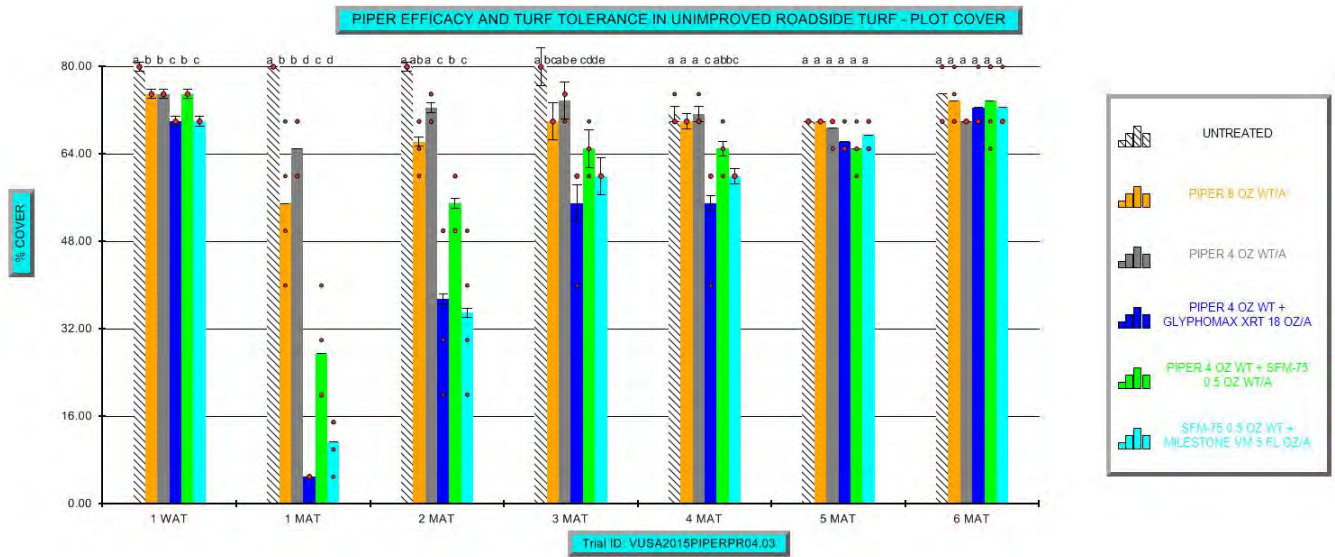


Chart 109. Overall average percent cover through 6 Months after Application B (MAT).



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 110. Annual ryegrass (*Lolium multiflorum*) control through 4 Months after Application B (MAT).

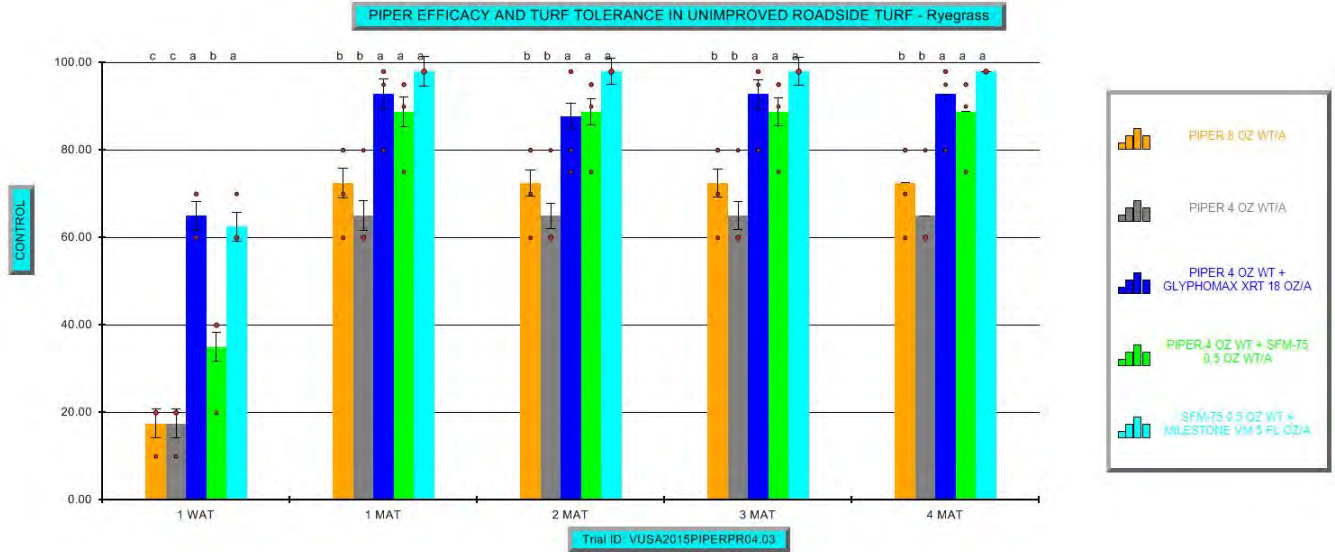
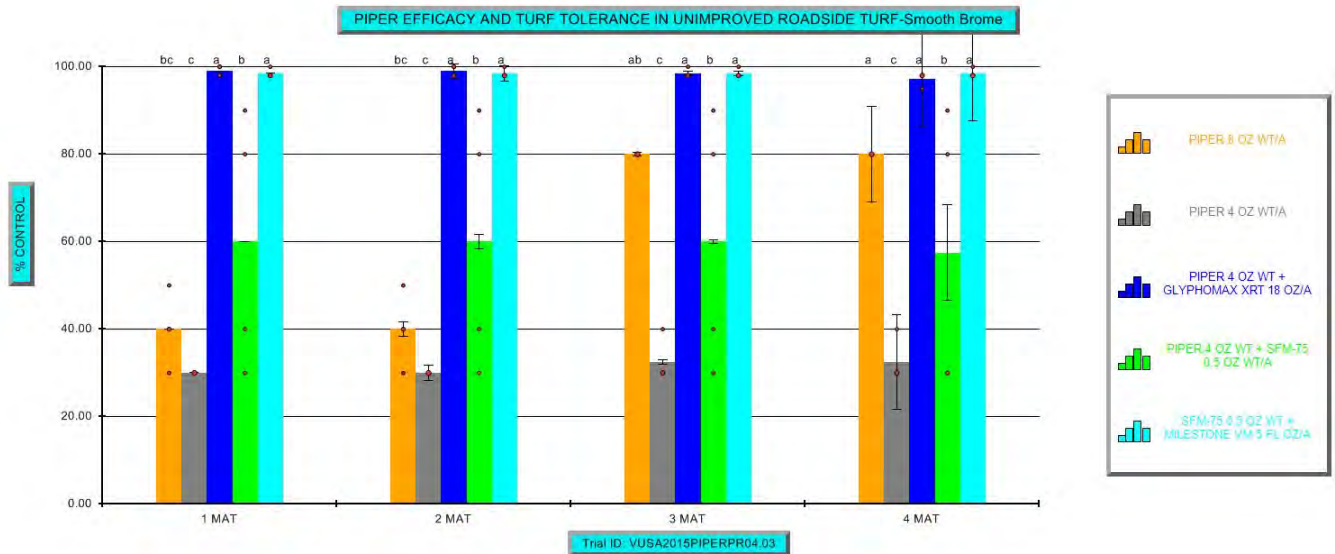


Chart 111. Smooth bromegrass (*Bromus inermis*) control at 1, 2, 3, and 4 Months after Application B (MAT).



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 112. Buckhorn plantain (*Plantago lanceolata*) control through 4 Months after Application B (MAT).

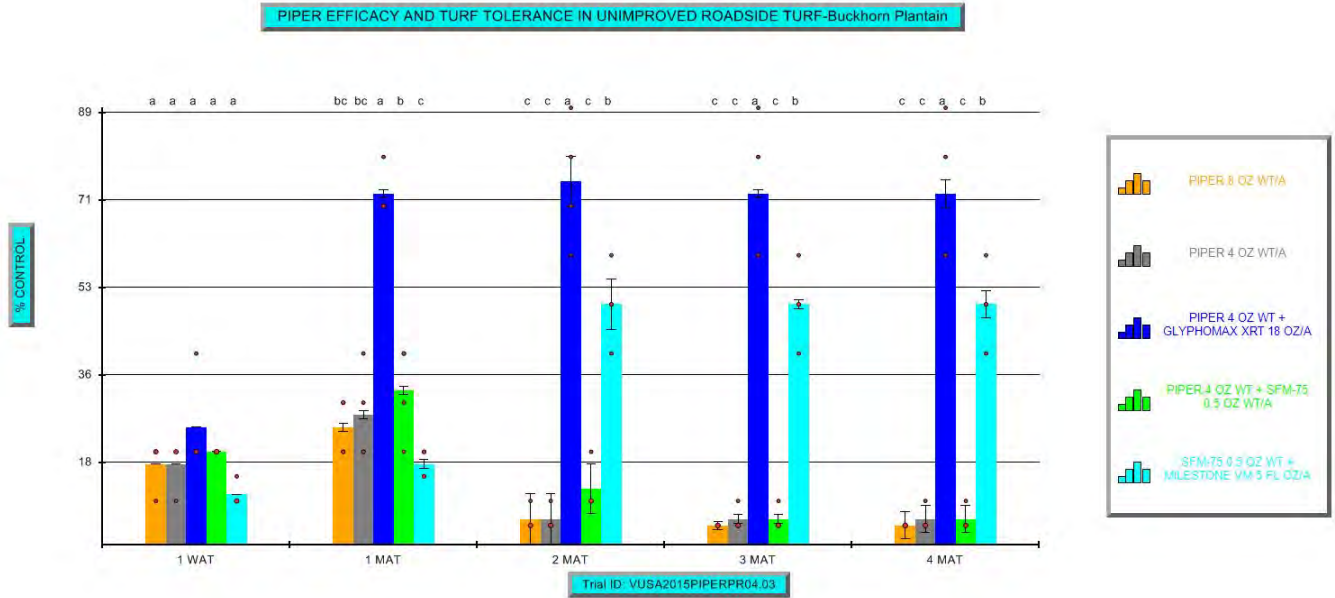
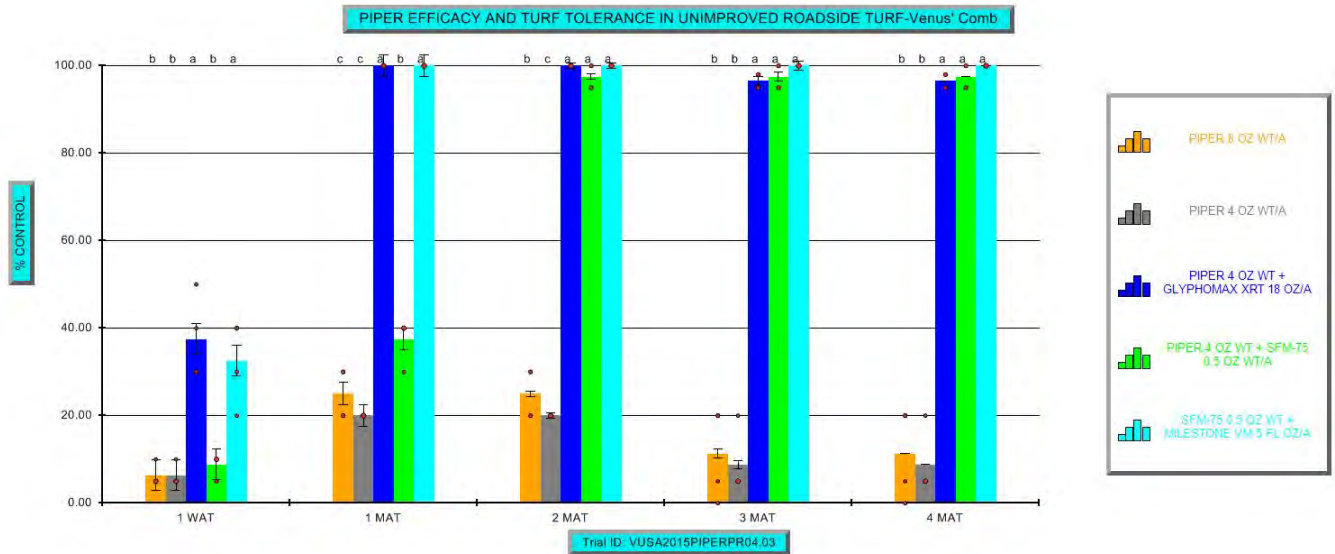


Chart 113. Venus's Comb (*Scandix pecten-veneris*) control through 4 Months after Application B (MAT).



Method 240SL for Winter Weed Control - Buttercup

General Trial Information

Investigator:Victor Maddox

Trial Location

City:Mayhew

Country:USA United States

State/Prov.:Mississippi

Directions:

SE Corner of Hwy 45 and Hwy 182 Junction.

Conducted Under
GLP:No

Conducted Under
GEP:Yes

Results and Discussion:

At the time of application, *Ranunculus sardous* was approximately 2" tall and mature, preflowering plants. Other species visibly present included smooth brome (*Bromus inermis*), Cherokee sedge (*Carex cherokeensis*), wild carrot (*Daucus carota*), corn speedwell (*Veronica arvensis*), and southern dewberry (*Rubus trivialis*). Overall cover was around 70 percent.

Overall Cover. At 30 DAT, a significant reduction in weed cover was observed in herbicide treated plots, compared to the untreated plots (Chart 97). This pattern remained through 60 DAT with no significant differences in cover by 91 DAT.

Buttercup Control. At 30 DAT, Milestone and Oust plus Accord showed the best control of buttercup followed by decreasing control as Method rates decreased (Chart 98). By 60 DAT, the highest rate of Method was as effective as Milestone or Oust plus Accord. This trend remained through 91 DAT.

Smooth Brome Control. Oust plus Accord XRT II showed the best control of smooth brome at 30 DAT (Chart 99). By 60 DAT, brome control with Oust plus Accord was not significantly different from treatments with Method. Control with Milestone was significantly less compared to other herbicide treatments. This trend remained through 91 DAT.

Corn Speedwell Control. Oust plus Accord showed significantly better control of corn speedwell at 30 DAT (Chart 100). By 60 DAT, Oust plus Accord was not significantly different than the highest rate of Method.

Trumpet Creeper (*Campsis radicans*) Cover. This species was not obvious at the time of application on March 7, but seemed to have been released from the applications. Cover ranged from 17.5 to 7.5 percent on May 6 (60 DAT) (Chart 101). Release is based upon the highest trumpet creeper cover in plots with the highest weed control. However, Milestone treated plots at 91 DAT has the lowest cover, but differences were not significant. This pattern remained through 120 DAT.

Southern Dewberry Cover. Although differences were not significant, there was a trend of 0 percent cover in plots with higher rates of Method (Chart 102). Oust plus Accord plots had the highest southern dewberry cover at 60 DAT. This pattern remained through 120 DAT.

Nodding Spurge (*Chamaesyce nutans*) Cover. At 91 DAT, nodding spurge cover was highest in plots treated with Method or Milestone, but differences were not significant (Chart 103). This trend remained through 120 DAT.

Johnsongrass (*Sorghum halepense*) Cover. Johnsongrass cover increased in herbicide treated plots compared to the untreated check, indicating a release at 91 DAT (Chart 104). This increase was significant in plots treated with Method at 1 pint and Oust plus Accord XRT compared to untreated plots at 91 DAT. This pattern was similar at 120 DAT.

Buckhorn Plantain (*Plantago lanceolata*) Cover. At 91 DAT, buckhorn plantain cover was higher in plots treated with Milestone but differences were not significant (Chart 105). This pattern remained through 120 DAT, but differences still remained not significant.

Method 240SL for Winter Weed Control – Buttercup (Continued)

Results and Discussion (Continued):

Overall Conclusions.

Higher rates of Method were required in this study to effectively control buttercup and corn speedwell. Method did have activity on smooth brome in this study. Some species were released, however, including nodding spurge and johnsongrass. Since neither of the species were either not up or had not germinated at the time of application, this increase was likely a release and not directly a result of the herbicide activity.

Interestingly, Oust plus Accord, a standard treatment, also released certain weeds. In particular, johnsongrass, southern dewberry and trumpet creeper showed increases following applications with the standard treatment. This may in part explain the prevalence of these species on roadsides following years of winter or spring applications of Oust plus Accord.

Additionally, there were some increases in buckhorn plantain, nodding spurge, and smooth brome cover following Milestone applications in this study.

These are noteworthy considerations when repeatedly using the same products year after year on roadsides. It should also be noted that based upon buttercup cover at 0 DAT and 400 DAT, the following year, repeat applications of Method would be required the following year to maintain control (Chart 106).

Investigator: Victor Maddox

Site and Design

Treated Plot Width: 10 FT

Treated Plot Length: 30 FT

Treated Plot Area: 300 FT² **Treatments:** 7

Replications: 4

Study Design: RACOB Randomized Complete Block (RCB)

Application Description

	A
Application Date:	Mar-8-2016
Appl. Start Time:	11:00 AM
Application Method:	SPRAY
Application Timing:	NCPOPE
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	71 F
% Relative Humidity:	60
Wind Velocity, Unit:	6 MPH
Wind Direction:	SE
Dew Presence (Y/N):	N no
% Cloud Cover:	40

Method 240SL for Winter Weed Control – Buttercup (Continued)

Application Equipment

	A
Equipment Type:	BACCAI
Operation Pressure, Unit:	20 PSI
Nozzle Type:	FLAFAN
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	WATER
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 L
Tank Mix (Y/N):	Y yes

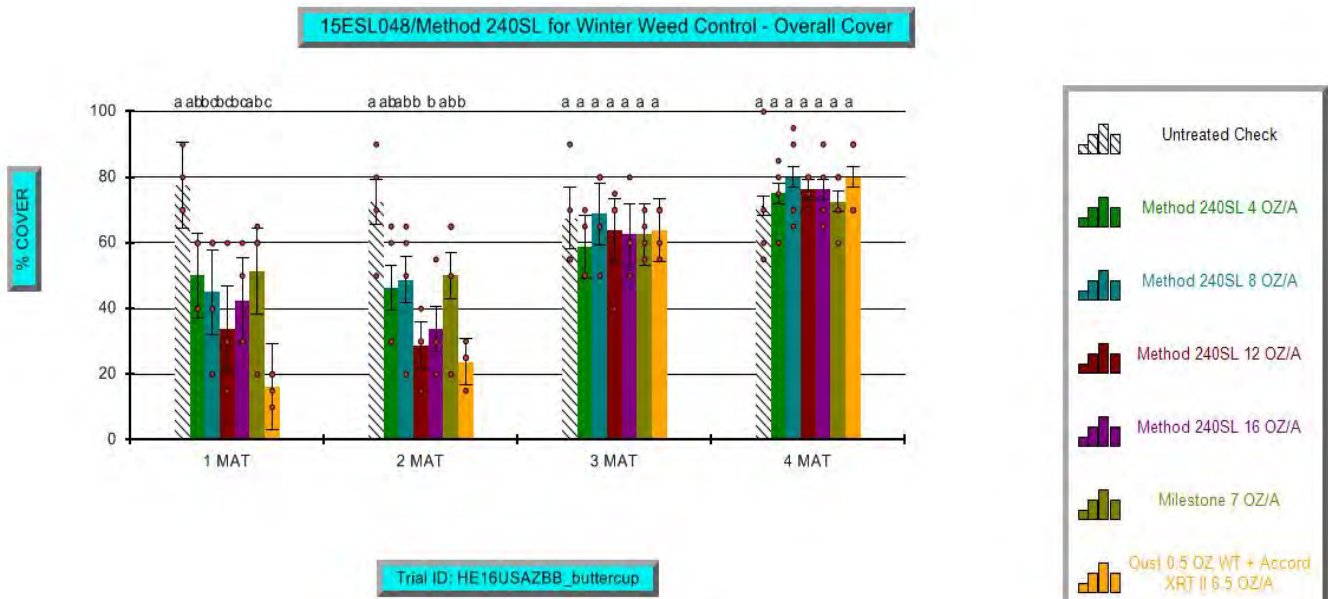
Reps: 4 Plots: 10 by 30 feet
 Spray vol: 25 GAL/AC

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Spray Volume	Volume Unit	Amt Product to Measure	Rep 1	2	3	4
1	Untreated Check										101	205	304	401
2	Method 240SL	2LBA/GAL		SL	0.118l/a			25GAL/AC		3.251 mL/mx	102	207	301	404
	NIS	100%		SL	0.25% v/v			25GAL/AC		6.517 mL/mx				
3	Method 240SL	2LBA/GAL		SL	0.237l/a			25GAL/AC		6.529 mL/mx	103	202	305	406
	NIS	100%		SL	0.25% v/v			25GAL/AC		6.517 mL/mx				
4	Method 240SL	2LBA/GAL		SL	0.355l/a			25GAL/AC		9.779 mL/mx	104	203	306	405
	NIS	100%		SL	0.25% v/v			25GAL/AC		6.517 mL/mx				
5	Method 240SL	2LBA/GAL		SL	0.473l/a			25GAL/AC		13.03 mL/mx	105	201	302	407
	NIS	100%		SL	0.25% v/v			25GAL/AC		6.517 mL/mx				
6	Milestone	21.1%AW/W		EC	0.207l/a			25GAL/AC		5.702 mL/mx	106	204	307	403
	NIS	100%		SL	0.25% v/v			25GAL/AC		6.517 mL/mx				
7	Oust	75%AW/W		DF	0.5oz wt/a			25GAL/AC		0.3905 g/mx	107	206	303	402
	Accord XRT II	4LBAE/GAL		SN	6.5fl oz/a			25GAL/AC		5.295 mL/mx				
	NIS	100%		SL	0.25% v/v			25GAL/AC		6.517 mL/mx				

Method 240SL for Winter Weed Control – Buttercup (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed	W Weed		
Pest Name	Overall	Bromus inermis	Ranunculus sar>	Carex cherokee>	Daucus carota	Veronica arven>		
Rating Date	Mar-7-2016	Mar-7-2016	Mar-7-2016	Mar-7-2016	Mar-7-2016	Mar-7-2016		
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Number of Subsamples	1	1	1	1	1	1		
Days After First/Last Applic.	0 0	0 0	0 0	0 0	0 0	0 0		
Trt-Eval Interval	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A		
ARM Action Codes								
Trt Treatment	Rate	Appl	1*	2*	3*	4*	5*	6*
No. Name	Rate Unit	Code						
1Untreated Check			69.5	26.3	36.3	1.3	4.3	6.3
2Method 240SL	0.118l/a		66.3	16.3	38.8	3.5	6.0	6.3
NIS	0.25% v/v							
3Method 240SL	0.237l/a		70.0	18.8	43.8	4.3	1.0	6.3
NIS	0.25% v/v							
4Method 240SL	0.355l/a		72.5	16.3	52.5	3.0	2.3	5.5
NIS	0.25% v/v							
5Method 240SL	0.473l/a		70.0	31.3	38.8	1.3	3.3	6.5
NIS	0.25% v/v							
6Milestone	0.207l/a		68.8	18.8	45.0	2.5	2.0	7.5
NIS	0.25% v/v							
7Oust	0.5oz wt/a		70.0	21.3	43.8	2.8	2.8	5.5
Accord XRT II	6.5fl oz/a							
NIS	0.25% v/v							
LSD P=Various			8.35	10.29	14.63	3.63	3.35	4.13
Standard Deviation			5.62	6.93	9.85	2.44	2.25	2.78
CV			8.08	32.61	23.07	92.44	73.38	44.46
Levene's F			3.354	1.782	1.328	0.784	3.813	0.561
Levene's Prob(F)			0.018*	0.152	0.289	0.592	0.01*	0.756
Skewness			0.0819	0.1933	0.419	0.6784	1.2173*	0.2572
Kurtosis			0.1234	-0.5696	0.0391	-0.0305	0.785	-1.0125
Mean Sep. Test								
Replicate F			2.183	8.448	6.789	3.327	6.009	2.817
Replicate Prob(F)			0.1254	0.0010	0.0029	0.0430	0.0051	0.0685
Treatment F			0.440	2.603	1.213	0.822	2.128	0.237
Treatment Prob(F)			0.8427	0.0538	0.3447	0.5676	0.1002	0.9583

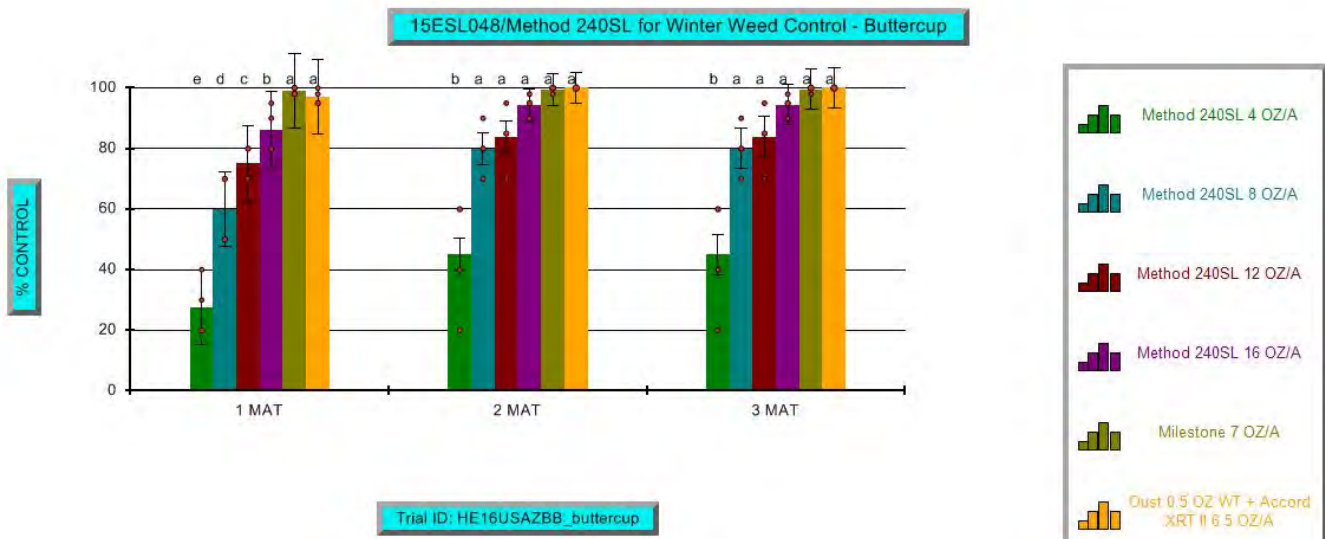
Chart 97. Overall cover through 4 MAT (120 DAT) following herbicide applications on March 8, 2016.



Method 240SL for Winter Weed Control – Buttercup (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Name	Rubus trivialis	Overall	Bromus inermis	Ranunculus sar>	Veronica arven>	Overall
Rating Date	Mar-7-2016	Apr-6-2016	Apr-6-2016	Apr-6-2016	Apr-6-2016	May-6-2016
Rating Type	GROUND	GROUND	CONTRO	CONTRO	CONTRO	GROUND
Rating Unit	%AREA	%AREA	%UNCK	%UNCK	%UNCK	%AREA
Number of Subsamples	1	1	1	1	1	1
Days After First/Last Applic.	0 0	30 30	30 30	30 30	30 30	60 60
Trt-Eval Interval	0 DA-A	30 DA-A	30 DA-A	30 DA-A	30 DA-A	60 DA-A
ARM Action Codes		L05	EC L05E	EC L05E	EC L05E	L05
Trt Treatment	Rate	Appl				
No. Name	Rate Unit	Code	7*	8*	9*	10*
1 Untreated Check			5.0	77.5a	0.0	0.0
2 Method 240SL	0.118l/a		3.8	50.0b	32.5e	27.5e
NIS	0.25% v/v					22.5c
3 Method 240SL	0.237l/a		3.8	45.0b	52.5cd	60.0d
NIS	0.25% v/v					42.5b
4 Method 240SL	0.355l/a		2.5	33.8bc	67.5b	75.0c
NIS	0.25% v/v					50.0b
5 Method 240SL	0.473l/a		2.5	42.5b	60.0bc	86.3b
NIS	0.25% v/v					52.5b
6 Milestone	0.207l/a		0.0	51.3b	42.5de	99.0a
NIS	0.25% v/v					27.5c
7 Oust	0.5oz wt/a		6.3	16.3c	86.3a	97.0a
Accord XRT II	6.5fl oz/a					88.3a
NIS	0.25% v/v					23.8d
LSD P=Various			5.96	22.84	13.75	10.42
Standard Deviation			4.01	15.37	9.12	6.91
CV			118.16	34.03	16.04	9.32
Levene's F			0.59	0.504	2.512	8.529
Levene's Prob(F)			0.734	0.798	0.068	0.001*
Skewness			1.9279*	0.0737	0.1084	-0.928
Kurtosis			3.2694*	-1.0851	0.1587	-0.2579
Mean Sep. Test				LSD.05	LSD.05	LSD.05
Replicate F			10.722	0.921	0.079	1.741
Replicate Prob(F)			0.0003	0.4508	0.9703	0.2015
Treatment F			1.000	5.866	17.347	61.370
Treatment Prob(F)			0.4552	0.0015	0.0001	0.0001

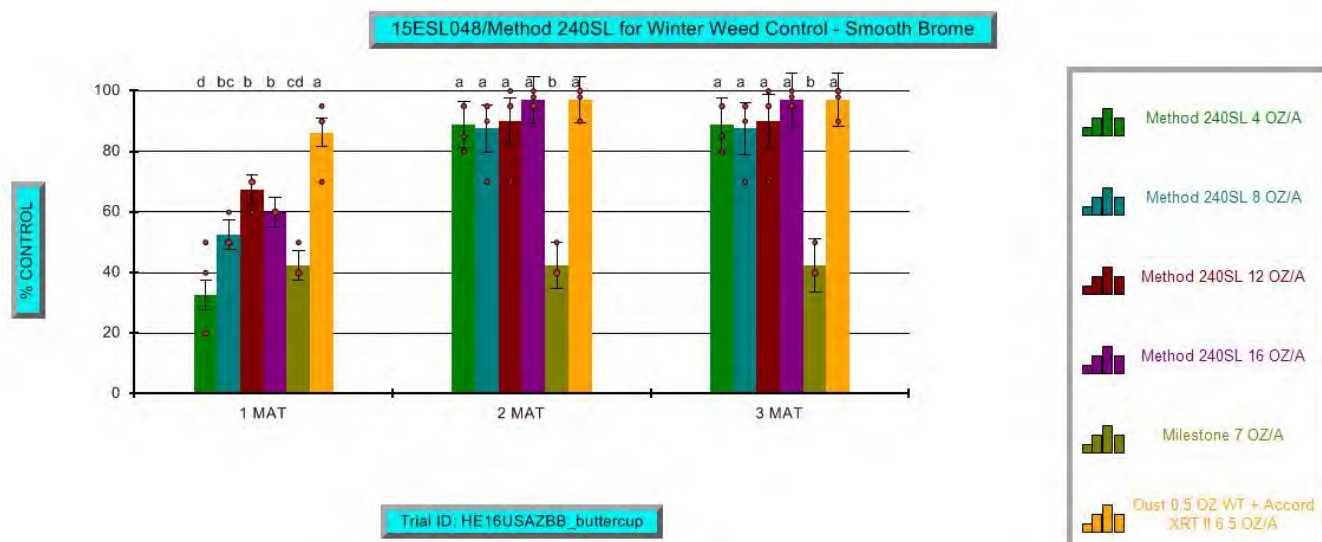
Chart 98. Buttercup (*Ranunculus sardous*) control through 3 MAT (91 DAT).



Method 240SL for Winter Weed Control – Buttercup (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed	W Weed		
Pest Name	Bromus inermis	Ranunculus sar>	Veronica arven>	Campsis radica>	Rubus trivialis	Overall		
Rating Date	May-6-2016	May-6-2016	May-6-2016	May-6-2016	May-6-2016	Jun-6-2016		
Rating Type	CONTRO	CONTRO	CONTRO	GROUND	GROUND	GROUND		
Rating Unit	%UNCK	%UNCK	%UNCK	%AREA	%AREA	%AREA		
Number of Subsamples	1	1	1	1	1	1		
Days After First/Last Applic.	60 60	60 60	60 60	60 60	60 60	91 91		
Trt-Eval Interval	60 DA-A	60 DA-A	60 DA-A	60 DA-A	60 DA-A	91 DA-A		
ARM Action Codes	EC L05E	EC L05E	EC L05E	L05	L05	L05		
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	13*	14*	15*	16*	17*	18*
1Untreated Check			0.0	0.0	0.0	7.5-	2.5-	67.5-
2Method 240SL	0.118l/a		88.8a	45.0c	25.0d	7.5-	1.3-	58.8-
NIS	0.25% v/v							
3Method 240SL	0.237l/a		87.5a	80.0b	65.0c	17.5-	1.3-	68.8-
NIS	0.25% v/v							
4Method 240SL	0.355l/a		90.0a	83.8b	68.8bc	10.0-	0.0-	63.8-
NIS	0.25% v/v							
5Method 240SL	0.473l/a		97.0a	94.5ab	86.3ab	9.5-	0.0-	62.5-
NIS	0.25% v/v							
6Milestone	0.207l/a		42.5b	99.5a	27.5d	8.3-	0.0-	62.5-
NIS	0.25% v/v							
7Oust	0.5oz wt/a		97.0a	100.0a	99.0a	14.5-	3.8-	63.8-
Accord XRT II	6.5fl oz/a							
NIS	0.25% v/v							
LSD P=Various			10.74	15.27	21.18	12.86	3.37	14.15
Standard Deviation			7.12	10.13	14.05	8.66	2.27	9.52
CV			8.5	12.09	22.69	81.08	181.7	14.9
Levene's F			0.547	3.798	2.021	0.64	1.333	0.412
Levene's Prob(F)			0.738	0.016*	0.124	0.697	0.286	0.863
Skewness			-1.4032*	-1.6975*	-0.2622	0.9969*	2.3123*	0.1445
Kurtosis			0.5531	2.7228*	-1.6063	1.1437	4.4394*	-0.2076
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			3.569	0.374	1.865	4.164	5.712	6.131
Replicate Prob(F)			0.0396	0.7731	0.1788	0.0210	0.0063	0.0046
Treatment F			33.587	16.705	18.520	0.792	1.615	0.492
Treatment Prob(F)			0.0001	0.0001	0.0001	0.5878	0.2001	0.8057

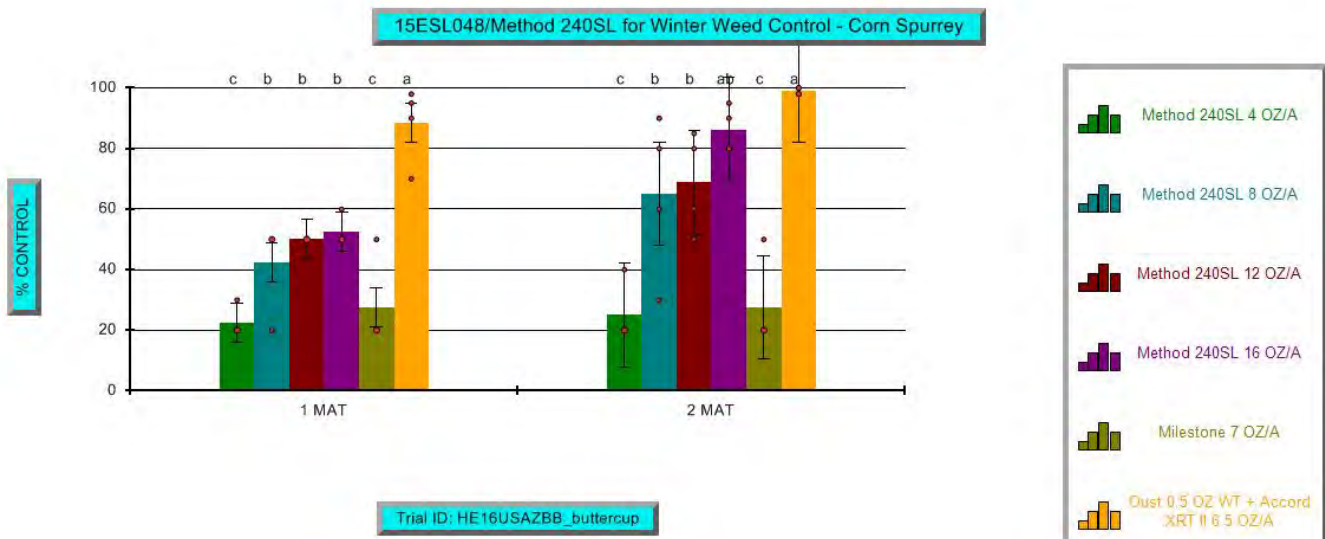
Chart 99. Smooth bromegrass (*Bromus inermis*) control through 3 MAT (91 DAT).



Method 240SL for Winter Weed Control – Buttercup (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Name	Bromus inermis	Ranunculus sar>	Campsis radica>	Rubus trivialis	Chamaesyce nut>
Rating Date	Jun-6-2016	Jun-6-2016	Jun-6-2016	Jun-6-2016	Jun-6-2016
Rating Type	CONTRO	CONTRO	GROUND	GROUND	GROUND
Rating Unit	%UNCK	%UNCK	%AREA	%AREA	%AREA
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	91 91	91 91	91 91	91 91	91 91
Trt-Eval Interval	91 DA-A	91 DA-A	91 DA-A	91 DA-A	91 DA-A
ARM Action Codes	EC L05E	EC L05E	L05	L05	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	19*	20*	21*
1Untreated Check			0.0	0.0	23.0-
2Method 240SL	0.118l/a		88.8a	45.0c	22.5-
NIS	0.25% v/v				1.8-
3Method 240SL	0.237l/a		87.5a	80.0b	33.8-
NIS	0.25% v/v				1.3-
4Method 240SL	0.355l/a		90.0a	83.8b	27.5-
NIS	0.25% v/v				0.0-
5Method 240SL	0.473l/a		97.0a	94.5ab	23.8-
NIS	0.25% v/v				0.0-
6Milestone	0.207l/a		42.5b	99.5a	17.5-
NIS	0.25% v/v				0.0-
7Oust	0.5oz wt/a		97.0a	100.0a	37.5-
Accord XRT II	6.5fl oz/a				3.8-
NIS	0.25% v/v				3.0-
LSD P=Various			10.74	15.27	35.93
Standard Deviation			7.12	10.13	24.18
CV			8.5	12.09	91.26
Levene's F			0.547	3.798	0.215
Levene's Prob(F)			0.738	0.016*	0.968
Skewness			-1.4032*	-1.6975*	0.7508
Kurtosis			0.5531	2.7228*	-0.6454
Mean Sep. Test			LSD.05	LSD.05	LSD.05
Replicate F			3.569	0.374	4.103
Replicate Prob(F)			0.0396	0.7731	0.0221
Treatment F			33.587	16.705	0.332
Treatment Prob(F)			0.0001	0.0001	0.9111
					5.618
					0.0067
					0.0001
					1.648
					1.005
					0.4525

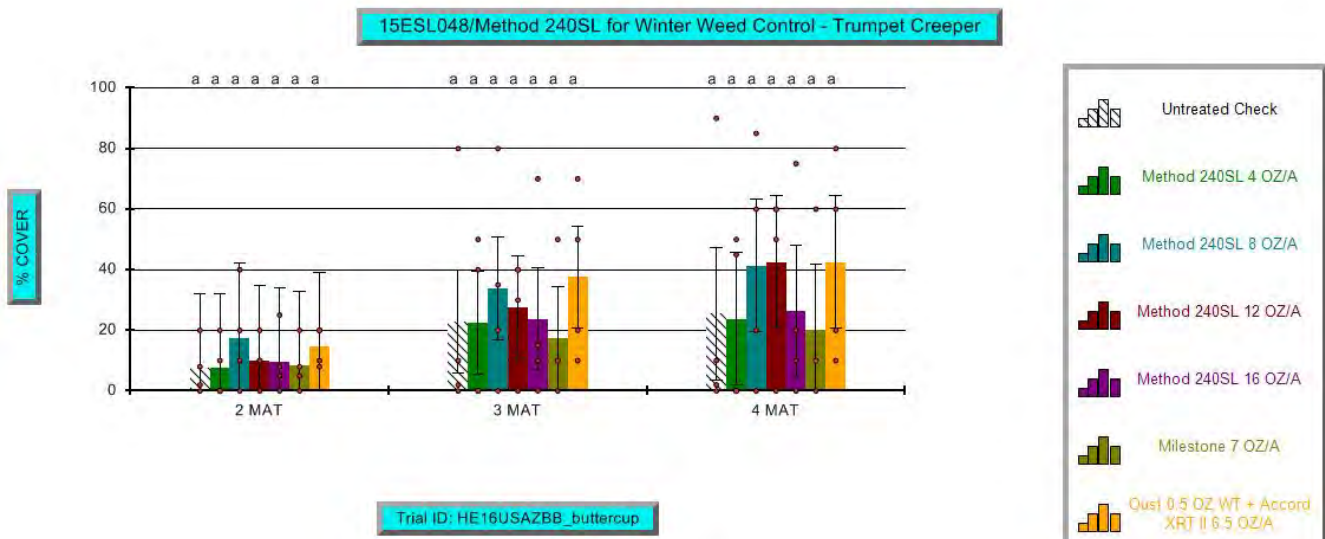
Chart 100. Corn speedwell (*Veronica arvensis*) control through 2 MAT (60 DAT).



Method 240SL for Winter Weed Control – Buttercup (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed	W Weed		
Pest Name	Sorghum halepe>	Plantago lance>	Overall	Campsis radica>	Rubus trivialis	Chamaesyce nut>		
Rating Date	Jun-6-2016	Jun-6-2016	Jul-5-2016	Jul-5-2016	Jul-5-2016	Jul-5-2016		
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Number of Subsamples	1	1	1	1	1	1		
Days After First/Last Applic.	91 91	91 91	120 120	120 120	120 120	120 120		
Trt-Eval Interval	91 DA-A	91 DA-A	120 DA-A	120 DA-A	120 DA-A	120 DA-A		
ARM Action Codes	L05	L05	L05	L05	L05	L05		
Trt Treatment	Rate	Appl	24*	25*	26*	27*	28*	29*
No. Name	Rate Unit	Code						
1Untreated Check			4.3b	7.5-	71.3-	25.5-	3.8-	4.0-
2Method 240SL	0.118l/a		10.0ab	7.5-	75.0-	23.8-	1.8-	5.0-
NIS	0.25% v/v							
3Method 240SL	0.237l/a		6.3b	8.0-	80.0-	41.3-	1.3-	6.3-
NIS	0.25% v/v							
4Method 240SL	0.355l/a		10.0ab	8.8-	76.3-	42.5-	1.3-	6.3-
NIS	0.25% v/v							
5Method 240SL	0.473l/a		15.0a	8.8-	76.3-	26.3-	0.0-	6.3-
NIS	0.25% v/v							
6Milestone	0.207l/a		10.0ab	10.0-	72.5-	20.0-	0.0-	8.8-
NIS	0.25% v/v							
7Oust	0.5oz wt/a		15.0a	8.8-	80.0-	42.5-	3.8-	3.5-
Accord XRT II	6.5fl oz/a							
NIS	0.25% v/v							
LSD P=Various			6.90	2.66	14.32	41.02	4.07	5.67
Standard Deviation			4.64	1.79	9.64	27.62	2.74	3.82
CV			46.09	21.13	12.7	87.17	163.19	66.84
Levene's F			1.272	0.628	0.993	0.236	0.881	0.582
Levene's Prob(F)			0.312	0.706	0.455	0.96	0.525	0.741
Skewness			0.6669	-1.2022*	0.2123	0.4917	2.552*	1.0381*
Kurtosis			-0.8655	-0.1338	-0.6189	-1.3115	6.8005*	0.8896
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			2.128	10.076	5.958	4.320	6.960	12.189
Replicate Prob(F)			0.1323	0.0004	0.0053	0.0184	0.0026	0.0001
Treatment F			3.003	0.975	0.487	0.518	1.296	0.842
Treatment Prob(F)			0.0326	0.4698	0.8094	0.7870	0.3084	0.5539

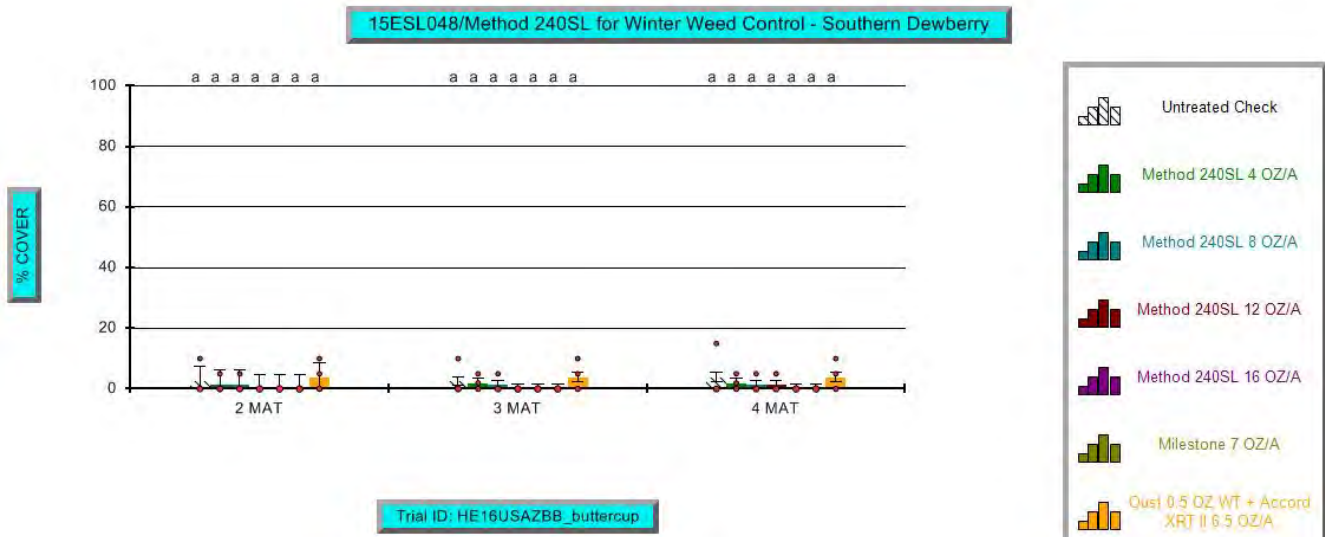
Chart 101. Trumpet creeper (*Campsis radicans*) cover through 4 MAT (120 DAT).



Method 240SL for Winter Weed Control – Buttercup (Continued)

Pest Type	W Weed	W Weed	W Weed			
Pest Name	Sorghum halep>	Plantago lance>	Ranunculus sar>			
Rating Date	Jul-5-2016	Jul-5-2016	Apr-12-2017			
Rating Type	GROUND	GROUND	GROUND			
Rating Unit	%AREA	%AREA	%UNCK			
Number of Subsamples	1	1	1			
Days After First/Last Applic.	120 120	120 120	401 401			
Trt-Eval Interval	120 DA-A	120 DA-A	401 DA-A			
ARM Action Codes	L05	L05	L05			
Trt No.	Treatment Name	Rate	Appl Code	30*	31*	32*
1	Untreated Check			6.8c	7.5-	60.0-
2	Method 240SL	0.118l/a		18.8bc	7.5-	40.0-
	NIS	0.25% v/v				
3	Method 240SL	0.237l/a		10.0bc	8.0-	50.0-
	NIS	0.25% v/v				
4	Method 240SL	0.355l/a		18.8bc	10.0-	55.0-
	NIS	0.25% v/v				
5	Method 240SL	0.473l/a		36.3a	11.3-	37.5-
	NIS	0.25% v/v				
6	Milestone	0.207l/a		21.3abc	12.5-	40.0-
	NIS	0.25% v/v				
7	Oust	0.5oz wt/a		22.5ab	10.0-	38.8-
	Accord XRT II	6.5fl oz/a				
	NIS	0.25% v/v				
LSD P=	Various			15.58	3.61	33.07
Standard Deviation				10.48	2.43	22.26
CV				54.67	25.51	48.51
Levene's F				1.401	0.10	1.78
Levene's Prob(F)				0.261	0.996	0.152
Skewness				1.1293*	0.8111	0.4163
Kurtosis				0.5162	1.2558	-0.5514
Mean Sep. Test				LSD.05	LSD.05	LSD.05
Replicate F				7.029	16.070	2.337
Replicate Prob(F)				0.0025	0.0001	0.1079
Treatment F				3.310	2.569	0.659
Treatment Prob(F)				0.0225	0.0562	0.6833

Chart 102. Southern dewberry (*Rubus trivialis*) cover through 4 MAT (120 DAT).



Method 240SL for Winter Weed Control – Buttercup (Continued)

Chart 103. Nodding spurge (*Chamaesyce nutans*) cover through 4 MAT (120 DAT).

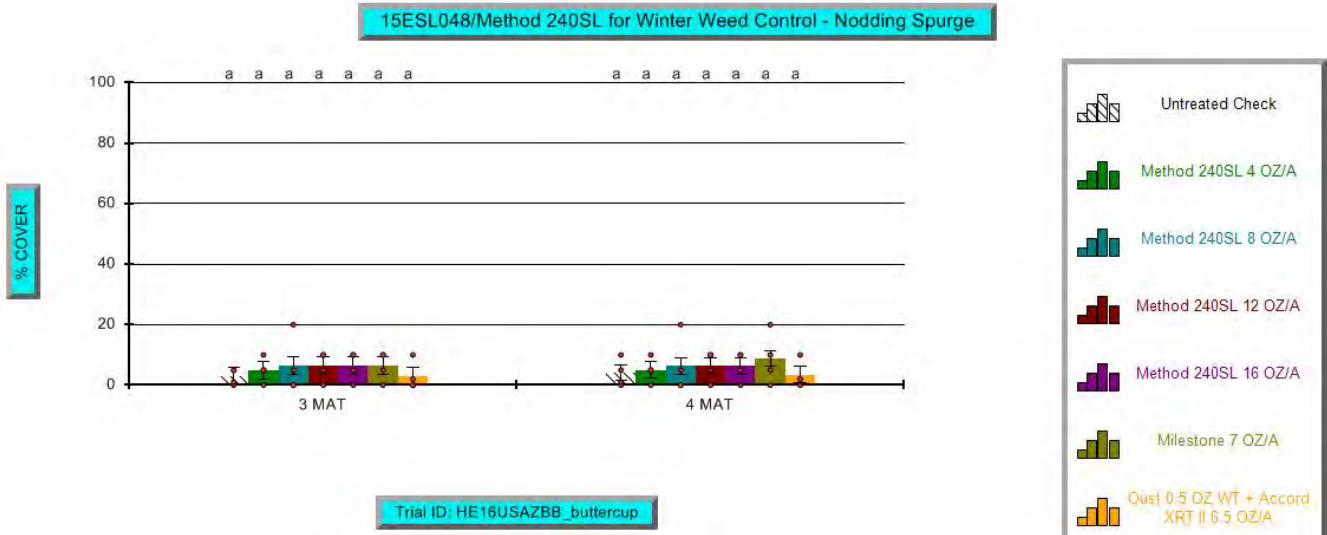
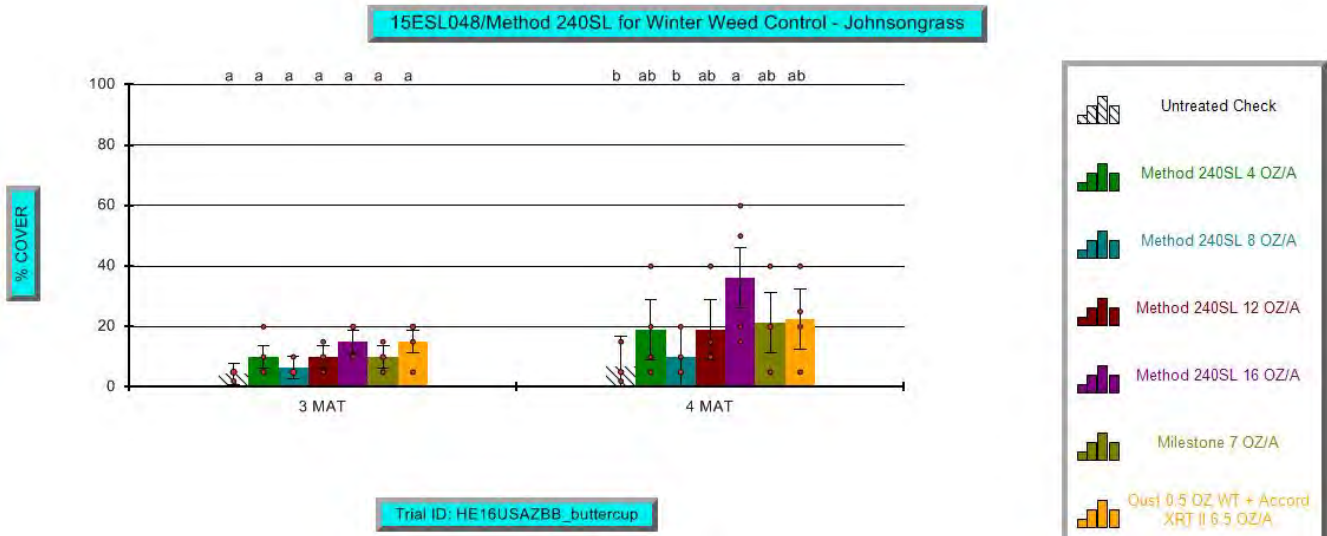


Chart 104. Johnsongrass (*Sorghum halepense*) cover through 4 MAT (120 DAT).



Method 240SL for Winter Weed Control – Buttercup (Continued)

Chart 105. Buckhorn plantain (*Plantago lanceolata*) cover through 4 MAT (120 DAT).

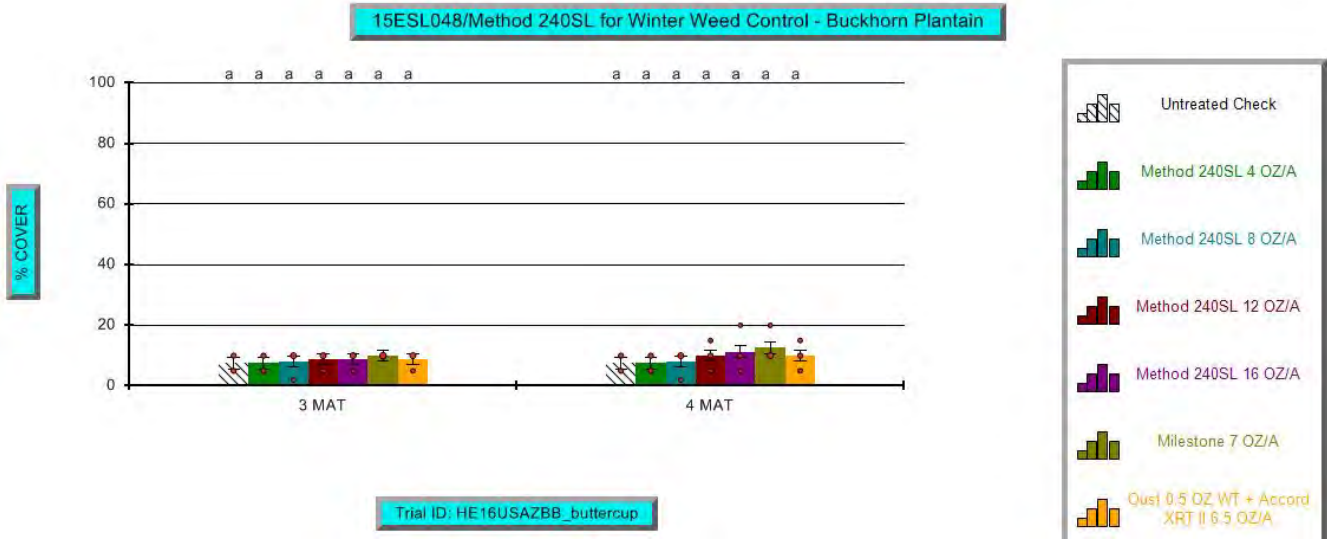
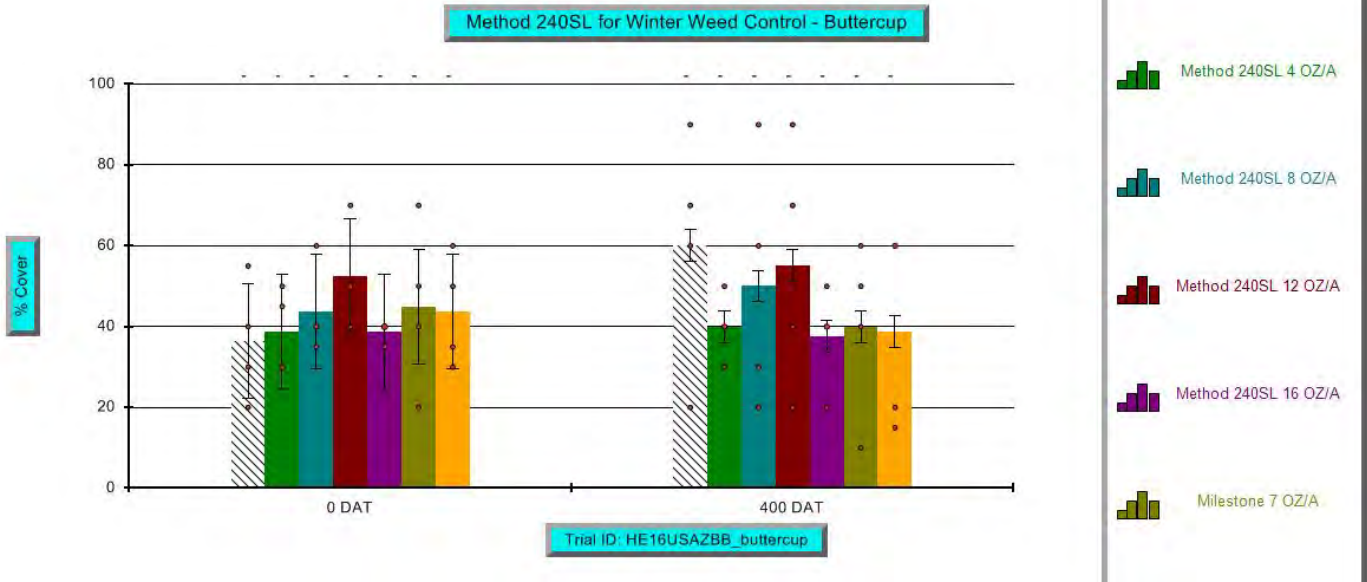


Chart 106. Buttercup (*Ranunculus sardous*) cover through 400 DAT.



Method 240SL for Winter Weed Control – Venus’s Comb
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General Trial Information

Investigator:Victor Maddox

Trial Location

City:Gibson
State/Prov.:Mississippi

Country:USA United States

Directions:

Approximately 1 mile south of Gibson, MS, on west side of Hwy 45.

Conducted Under GLP:No

Conducted Under GEP:Yes

Results and Discussion:

At the time of application, Venus’s Comb (*Scandix pecten-veneris*) was at pre-flowering state. Other species visibly present included hairy vetch (*Vicia villosa*), buckhorn plantain (*Plantago lanceolata*), smooth brome grass (*Bromus inermis*), and little hopclover (*Trifolium dubium*). Overall cover was around 80 percent.

Overall Cover. At 30 DAT, a significant reduction in weed cover was observed in herbicide treated plots, compared to the untreated plots (Chart 107). This pattern remained through 59 DAT. By 91 DAT, only two herbicide treatments had significantly less cover than the untreated plots with Oust plus Accord having the least cover on average (55%). This pattern remained through 120 DAT.

Venus’s Comb Control. At 30 DAT, significantly more control of Venus’s comb was observed in the two higher rates (12 and 16 oz/A) of Method (Chart 108). The lowest rate of Method (4 oz/A) and Oust plus Accord showed the least control (35 and 45 percent, respectively). By 59 DAT, Milestone or higher rates of Method showed significantly better control than the lowest rate of Method or Oust plus Accord.

Buckhorn Plantain Control. At 30 DAT, the highest amount of buckhorn plantain control was observed in plots treated with higher rates of Method (Chart 109). This pattern remained through 59 DAT.

Hairy Vetch Control. All rates of Method or Milestone were effective in controlling hairy vetch with 100% control at 30 DAT (Chart 110). This pattern remained through 59 DAT.

Smooth Brome Cover. At 59 DAT, smooth brome cover was highest in untreated, 4 oz rate of Method, and the Milestone treated plots (Chart 111). This trend remained through 91 DAT.

Turfgrass Response

Bahiagrass (*Paspalum notatum*). At 59 DAT, bahiagrass appeared to be released with the highest cover in plots treated with Milestone or higher rates of Method, but differences were not significant (Chart 112). This trend remained through 120 DAT. Some discoloration was observed in all treatments at 59 DAT (Chart 113), but turf regained color.

Bermudagrass (*Cynodon dactylon*). At 59 DAT, bermudagrass showed a trend similar to bahiagrass, with the highest cover in plots treated with Milestone or higher rates of Method (Chart 114). However, differences were not significant. At 91 DAT, the trend was similar, but bermudagrass cover in the untreated plots had increased (16.3%) with only plots receiving the highest rate (16 oz/A) of Method having greater bermudagrass cover (20%). This trend remained through 120 DAT.

Method 240SL for Winter Weed Control – Venus's Comb (Continued)

Results and Discussion (Continued):

Overall Conclusions

Method was effective controlling hairy vetch at all rates. Venus's comb control was best at the 12 and 16 oz/A rates of Method. The best buckhorn plantain control in the study was observed with 16 oz/A of Method, but was only 77.5% on average. However, this was significantly better than Milestone or Oust plus Accord at 15 and 22.5% control, respectively. Smooth brome grass showed some release with Method at 4 oz/A or Milestone.

Some bahiagrass discoloration was observed but turf recovered and no discoloration was observed on bermudagrass and cover of both species increased in treatments with less weed cover.

It should be noted that the standard treatment of Oust plus Accord was not as effective controlling buckhorn plantain, nor was Milestone. This may, in part, explain the extent of buckhorn plantain on roadsides in Mississippi. Similar results were observed for hairy vetch and Venus's comb in the study, possibly explaining why they are common in roadsides in Mississippi, as well.

Site and Design

Treated Plot Width: 4 m

Treated Plot Length: 6 m

Treated Plot Area: 24 m² Treatments: 7

Replications: 4

Study Design: RACOBL Randomized Complete Block (RCB)

Application Description

	A
Application Date:	Mar-8-2016
Appl. Start Time:	11:00 AM
Application Method:	SPRAY
Application Timing:	NCPOPE
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	72 F
% Relative Humidity:	60
Wind Velocity, Unit:	8 MPH
Wind Direction:	S
Dew Presence (Y/N):	N no
Soil Moisture:	NORMAL
% Cloud Cover:	50

Application Equipment

	A
Equipment Type:	BACCAI
Operation Pressure, Unit:	20 PSI
Nozzle Type:	FLAFAN
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	WATER
Spray Volume, Unit:	25 GAL/AC
Mix Size, Unit:	2 L
Tank Mix (Y/N):	Y yes

Reps: 4

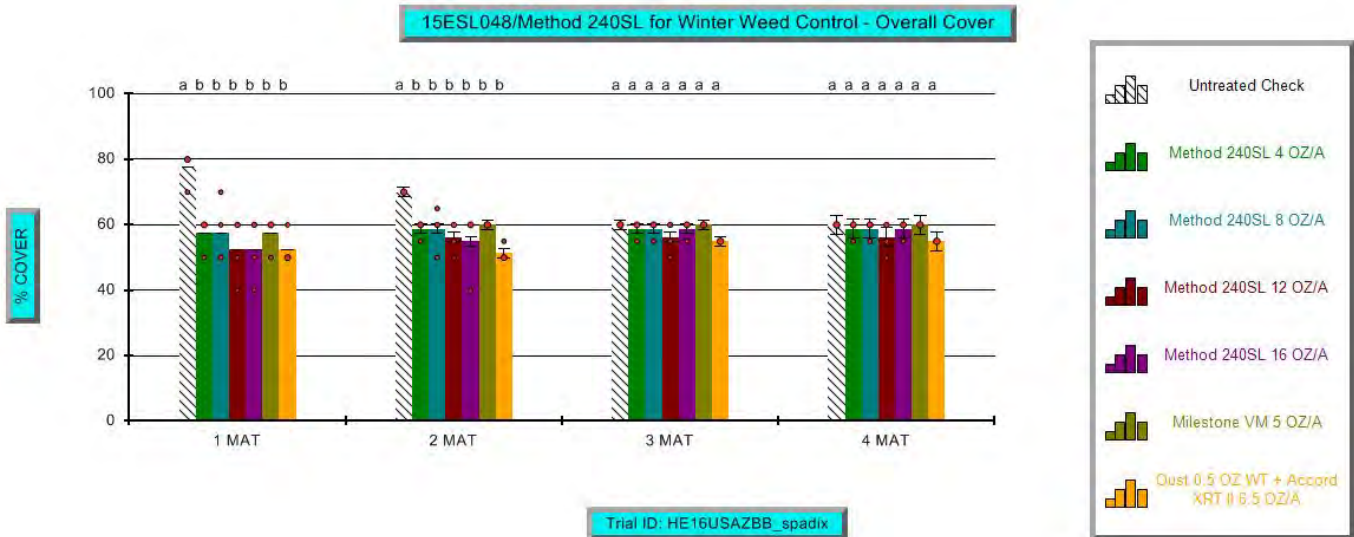
Appl Code: _

Plots: 4 by 6 meters

Method 240SL for Winter Weed Control – Venus’s Comb (Continued)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Appl Code	Spray Volume	Volume Unit	Amt Product to Measure	Rep 1	Rep 2	Rep 3	Rep 4
1	Untreated Check										101	205	304	401
2	Method 240SL NIS	2LBA/GAL	100%	SL	0.118l/a			200L/ha		2.799 mL/mx	102	207	301	404
3	Method 240SL NIS	2LBA/GAL	100%	SL	0.237l/a			200L/ha		5.622 mL/mx	103	202	305	406
4	Method 240SL NIS	2LBA/GAL	100%	SL	0.355l/a			200L/ha		8.421 mL/mx	104	203	306	405
5	Method 240SL NIS	2LBA/GAL	100%	SL	0.473l/a			200L/ha		11.22 mL/mx	105	201	302	407
6	Milestone NIS	21.1%AW/W	100%	EC	0.207l/a			200L/ha		4.91 mL/mx	106	204	307	403
7	Oust Accord XRT II NIS	75%AW/W	100%	DF	0.5oz wt/a			200L/ha		0.3363 g/mx	107	206	303	402
		4LBAE/GAL		SN	6.5fl oz/a			200L/ha		4.56 mL/mx				
		100%		SL	0.25% v/v			200L/ha		4.799 mL/mx				

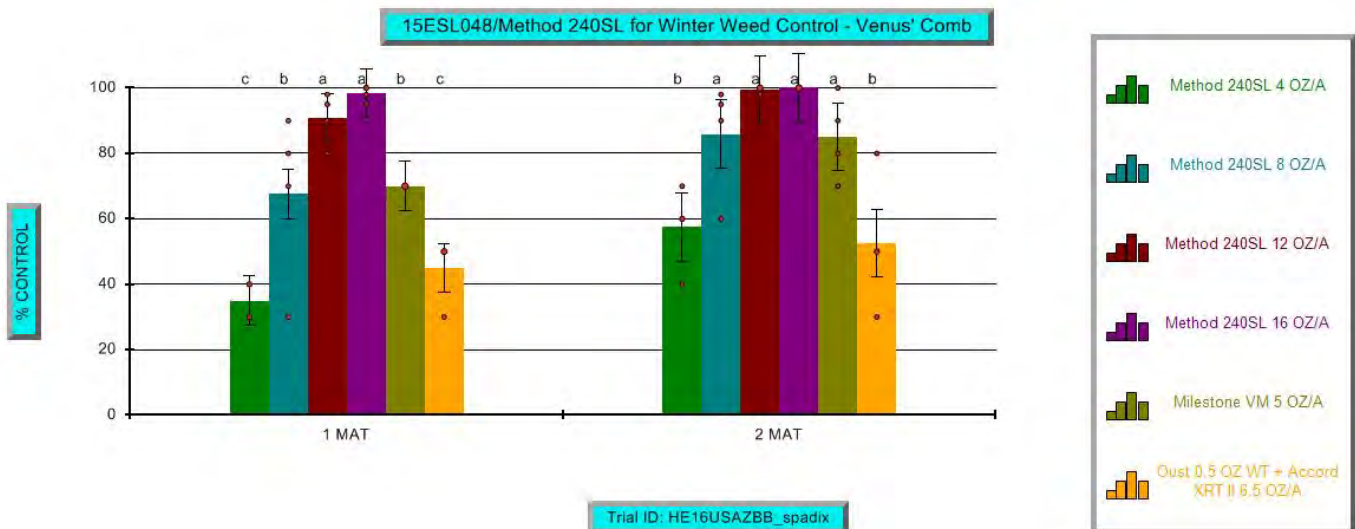
Chart 107. Overall cover through 4 MAT (120 DAT) following herbicide applications on March 8, 2016.



Method 240SL for Winter Weed Control – Venus’s Comb (Continued)

Pest Type	W Weed Overall	W Weed Scandix pecten->	W Weed Vicia villosa	W Weed Bromus inermis	W Weed Plantago lance->	W Weed Trifolium dubi->		
Pest Name								
Crop Code								
Crop Scientific Name								
Crop Name								
Rating Date	Mar-8-2016	Mar-8-2016	Mar-8-2016	Mar-8-2016	Mar-8-2016	Mar-8-2016		
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit	%AREA	%AREA	%AREA	%AREA	%AREA	%AREA		
Number of Subsamples	1	1	1	1	1	1		
Days After First/Last Applic.	0 0	0 0	0 0	0 0	0 0	0 0		
Trt-Eval Interval	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A		
ARM Action Codes								
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	1*	2*	3*	4*		
1 Untreated Check			75.0	35.0	8.8	7.5	8.0	10.0
2 Method 240SL	0.118l/a		77.5	40.0	13.8	5.0	6.3	10.0
NIS	0.25% v/v							
3 Method 240SL	0.237l/a		80.0	37.5	10.0	5.0	8.8	10.0
NIS	0.25% v/v							
4 Method 240SL	0.355l/a		77.5	40.0	7.5	5.0	7.5	10.0
NIS	0.25% v/v							
5 Method 240SL	0.473l/a		80.0	40.0	8.8	5.0	7.5	10.0
NIS	0.25% v/v							
6 Milestone	0.207l/a		77.5	37.5	8.8	5.0	7.5	10.0
NIS	0.25% v/v							
7 Oust	0.5oz wt/a		77.5	37.5	7.5	5.0	7.5	10.0
Accord XRT II	6.5fl oz/a							
NIS	0.25% v/v							
LSD P=Various			6.35	7.49	5.00	2.81	3.84	.
Standard Deviation			4.27	5.04	3.36	1.89	2.58	0.00
CV			5.49	13.19	36.22	35.28	34.11	0.0
Levene's F			0.833	0.476	0.75	1.00	0.722	0.00
Levene's Prob(F)			0.558	0.818	0.616	0.451	0.636	.
Skewness			-1.4727*	0.2869	0.8912*	5.2915*	-0.0528	.
Kurtosis			0.1762	-0.9557	2.0264*	28.0*	-2.116*	.
Mean Sep. Test								
Replicate F			1.304	11.391	0.632	1.000	1.770	0.000
Replicate Prob(F)			0.3036	0.0002	0.6041	0.4155	0.1888	1.0000
Treatment F			0.652	0.563	1.632	1.000	0.334	0.000
Treatment Prob(F)			0.6882	0.7545	0.1958	0.4552	0.9102	1.0000

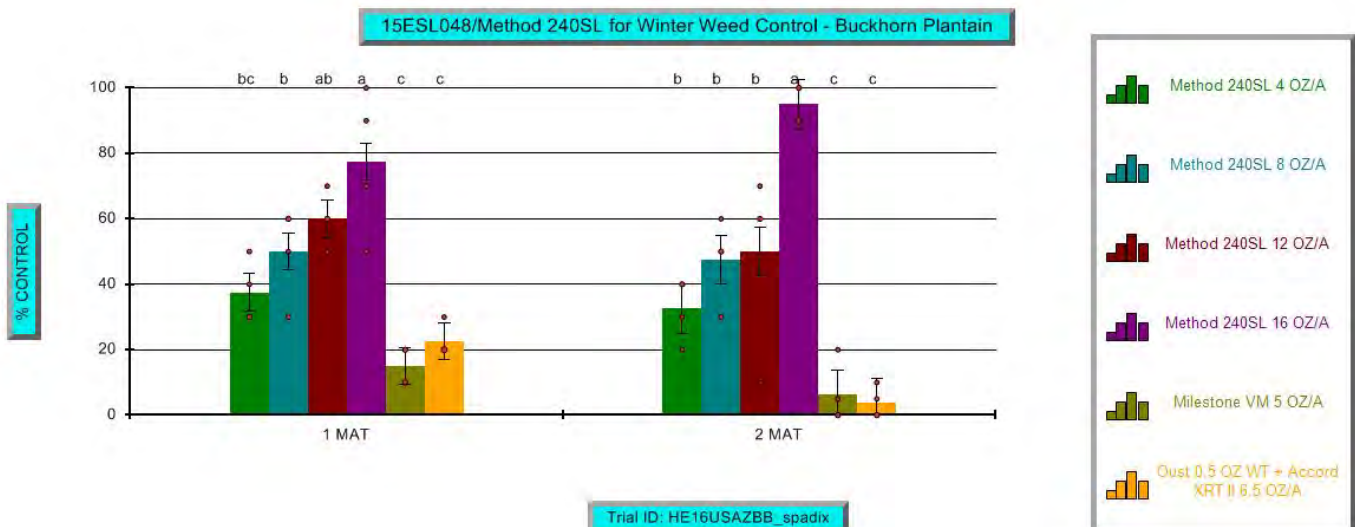
Chart 108. Venus’s Comb (*Scandix pecten-veneris*) control through 2 MAT (59 DAT).



Method 240SL for Winter Weed Control – Venus’s Comb (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed					
Pest Name	Scandix pecten->	Overall	Plantago lance>	Vicia villosa					
Crop Code					PASNO	PASNO			
Crop Scientific Name					Paspalum notat>	Paspalum notat>			
Crop Name					Water couch	Water couch			
Rating Date	Apr-7-2016	Apr-7-2016	Apr-7-2016	Apr-7-2016	Apr-7-2016	Apr-7-2016			
Rating Type	CONTRO	GROUND	CONTRO	CONTRO	GROUND	COLOR			
Rating Unit	%UNCK	%AREA	%UNCK	%UNCK	%AREA	1-9			
Number of Subsamples	1	1	1	1	1	1			
Days After First/Last Applic.	30 30	30 30	30 30	30 30	30 30	30 30			
Trt-Eval Interval	30 DA-A	30 DA-A	30 DA-A	30 DA-A	30 DA-A	30 DA-A			
ARM Action Codes	EC L05E	L05	EC L05E	EC L05E	L05	L05			
Trt Treatment	Rate	Appl	7*	8*	9*	10*	11*	12*	
No. Name	Rate	Unit	Code	Code	Code	Code	Code	Code	
1Untreated Check				0.0	77.5a	0.0	0.0	10.0-	6.0-
2Method 240SL	0.118l/a			35.0c	57.5b	37.5cd	100.0a	15.0-	5.5-
NIS	0.25% v/v								
3Method 240SL	0.237l/a			67.5b	57.5b	50.0bc	100.0a	18.8-	5.5-
NIS	0.25% v/v								
4Method 240SL	0.355l/a			90.8a	52.5b	60.0ab	100.0a	25.0-	5.5-
NIS	0.25% v/v								
5Method 240SL	0.473l/a			98.3a	52.5b	77.5a	100.0a	25.0-	4.8-
NIS	0.25% v/v								
6Milestone	0.207l/a			70.0b	57.5b	15.0e	100.0a	25.0-	5.8-
NIS	0.25% v/v								
7Oust	0.5oz wt/a			45.0c	52.5b	22.5de	27.5b	15.0-	5.5-
Accord XRT II	6.5fl oz/a								
NIS	0.25% v/v								
LSD P=Various				17.50	10.91	20.27	3.08	11.28	0.87
Standard Deviation				11.61	7.35	13.45	2.04	7.59	0.59
CV				17.14	12.62	30.74	2.32	39.73	10.68
Levene's F				1.871	1.143	2.491	1.00	4.259	3.167
Levene's Prob(F)				0.15	0.373	0.07	0.446	0.006*	0.023*
Skewness				-0.2475	0.5856	0.5733	-1.9295*	0.5781	-0.9203*
Kurtosis				-1.4047	0.2657	-0.2573	1.9153*	-0.4708	-0.0893
Mean Sep. Test				LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F				1.623	0.949	0.023	1.000	0.470	1.241
Replicate Prob(F)				0.2260	0.4381	0.9951	0.4199	0.7070	0.3240
Treatment F				18.128	5.824	12.207	841.000	2.556	1.690
Treatment Prob(F)				0.0001	0.0016	0.0001	0.0001	0.0572	0.1809

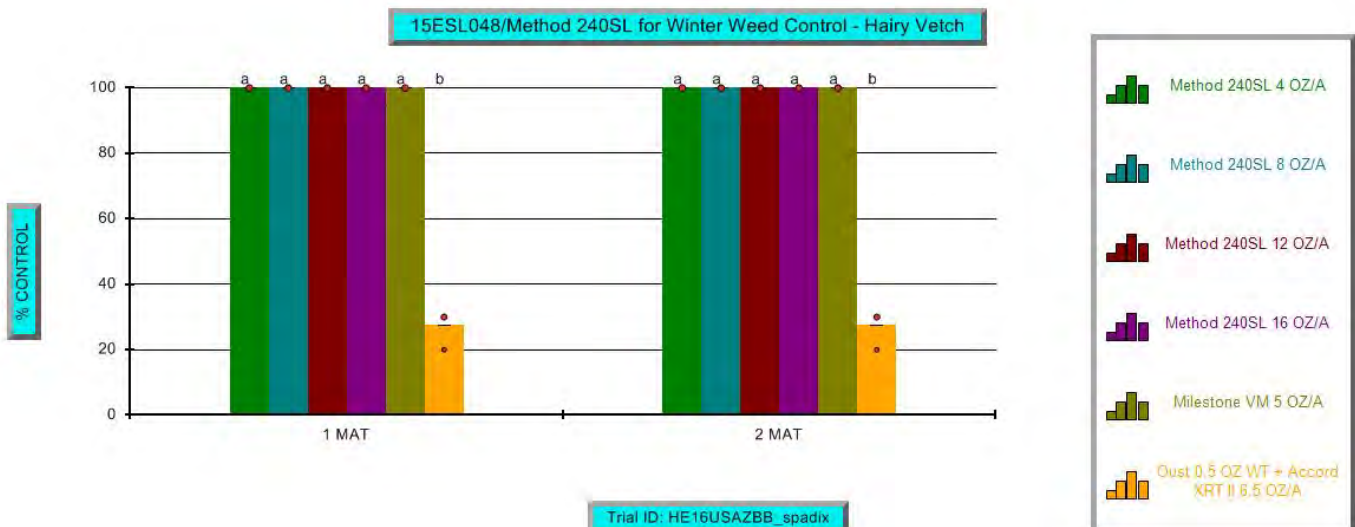
Chart 109. Buckhorn plantain (*Plantago lanceolata*) control through 2 MAT (59 DAT).



Method 240SL for Winter Weed Control – Venus’s Comb (Continued)

Pest Type	W Weed Overall	W Weed Scandix pecten->	W Weed Vicia villosa	W Weed Bromus inermis	W Weed Plantago lance->	PASNO Paspalum notat->		
Pest Name						Water couch		
Crop Code								
Crop Scientific Name								
Crop Name								
Rating Date	May-6-2016	May-6-2016	May-6-2016	May-6-2016	May-6-2016	May-6-2016		
Rating Type	GROUND	CONTRO	CONTRO	GROUND	CONTRO	GROUND		
Rating Unit	%AREA	%UNCK	%UNCK	%AREA	%UNCK	%AREA		
Number of Subsamples	1	1	1	1	1	1		
Days After First/Last Applic.	59 59	59 59	59 59	59 59	59 59	59 59		
Trt-Eval Interval	59 DA-A	59 DA-A	59 DA-A	59 DA-A	59 DA-A	59 DA-A		
ARM Action Codes	L05	EC L05E	EC L05E	L05	EC L05E	L05		
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	13*	14*	15*	16*	17*	18*
1Untreated Check			70.0a	0.0	0.0	7.5a	0.0	10.0-
2Method 240SL	0.118l/a		58.8b	57.5b	100.0a	5.0ab	32.5b	15.0-
NIS	0.25% v/v							
3Method 240SL	0.237l/a		58.8b	85.8a	100.0a	0.5c	47.5b	18.8-
NIS	0.25% v/v							
4Method 240SL	0.355l/a		56.3bc	99.5a	100.0a	0.0c	50.0b	25.0-
NIS	0.25% v/v							
5Method 240SL	0.473l/a		55.0bc	100.0a	100.0a	0.5c	95.0a	25.0-
NIS	0.25% v/v							
6Milestone	0.207l/a		60.0b	85.0a	100.0a	2.3bc	6.3c	25.0-
NIS	0.25% v/v							
7Oust	0.5oz wt/a		51.3c	52.5b	27.5b	0.3c	3.8c	17.5-
Accord XRT II	6.5fl oz/a							
NIS	0.25% v/v							
LSD P=Various			6.52	18.80	3.08	3.03	19.63	11.22
Standard Deviation			4.39	12.47	2.04	2.04	13.03	7.55
CV			7.49	15.59	2.32	89.35	33.26	38.8
Levene's F			0.794	1.233	1.00	0.787	0.503	3.308
Levene's Prob(F)			0.585	0.334	0.446	0.59	0.77	0.019*
Skewness			-0.3881	-0.7959	-1.9295*	2.2829*	0.4788	0.5307
Kurtosis			0.6837	-0.6424	1.9153*	7.1641*	-0.9809	-0.3873
Mean Sep. Test			LSD.05	LSD.05	LSD.05	LSD.05	LSD.05	LSD.05
Replicate F			3.093	1.790	1.000	1.393	1.653	0.391
Replicate Prob(F)			0.0531	0.1923	0.4199	0.2772	0.2195	0.7607
Treatment F			7.082	10.800	841.000	8.041	26.804	2.405
Treatment Prob(F)			0.0005	0.0002	0.0001	0.0003	0.0001	0.0695

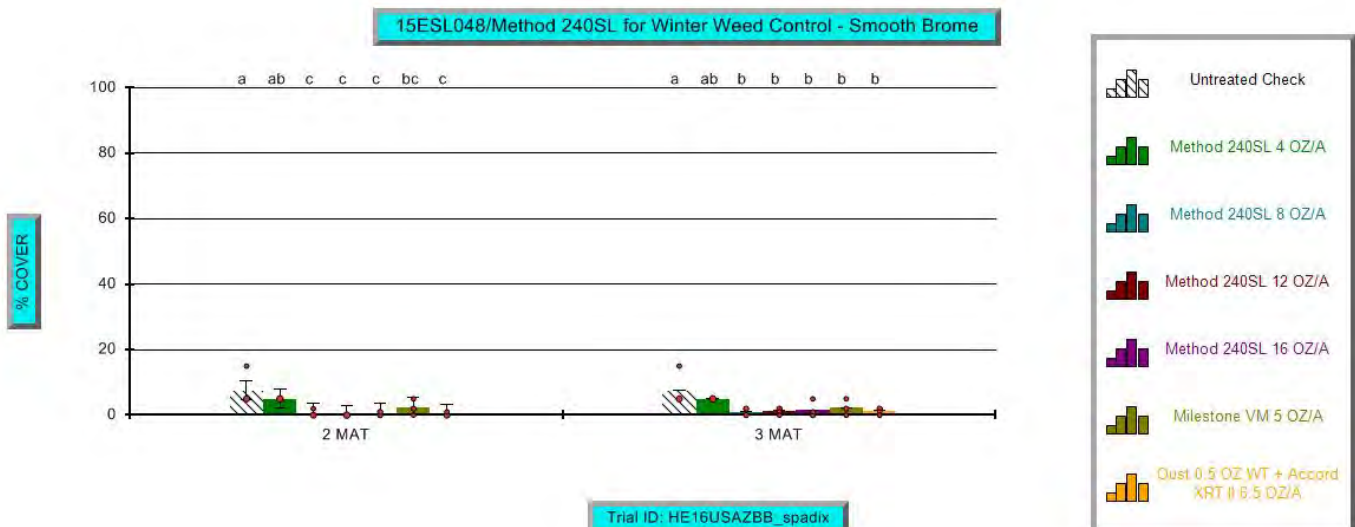
Chart 110. Hairy vetch (*Vicia villosa*) control through 2 MAT (59 DAT).



Method 240SL for Winter Weed Control – Venus’s Comb (Continued)

Pest Type	CYNDA		PASNO		W Weed Overall		W Weed Bromus inermis		PASNO		CYNDA		
Pest Name	Cynodon dactyl>		Paspalum notat>						Paspalum notat>		Cynodon dactyl>		
Crop Code	Dog's-tooth gr>		Water couch						Water couch		Dog's-tooth gr>		
Crop Scientific Name	May-6-2016		May-6-2016		Jun-7-2016		Jun-7-2016		Jun-7-2016		Jun-7-2016		
Crop Name	GROUND		COLOR		GROUND		GROUND		GROUND		GROUND		
Rating Date	%AREA		1-9		%AREA		%AREA		%AREA		%AREA		
Rating Type	1		1		1		1		1		1		
Rating Unit	59 59		59 59		91 91		91 91		91 91		91 91		
Number of Subsamples	59 DA-A		59 DA-A		91 DA-A		91 DA-A		91 DA-A		91 DA-A		
Days After First/Last Applic.	L05		L05		L05		L05		L05		L05		
Trt-Eval Interval	L05		L05		L05		L05		L05		L05		
ARM Action Codes	19*		20*		21*		22*		23*		24*		
1 Untreated Check	10.0-		6.0a		60.0a		7.5a		22.5-		16.3-		
2 Method 240SL	0.118l/a	13.8-	4.8bcd		58.8ab		5.0ab		25.0-		13.8-		
NIS	0.25% v/v												
3 Method 240SL	0.237l/a	13.8-	5.0bc		58.8ab		1.0c		30.0-		13.8-		
NIS	0.25% v/v												
4 Method 240SL	0.355l/a	11.3-	5.0bc		56.3bc		1.3c		35.0-		11.3-		
NIS	0.25% v/v												
5 Method 240SL	0.473l/a	17.5-	4.5cd		58.8ab		1.5c		32.5-		20.0-		
NIS	0.25% v/v												
6 Milestone	0.207l/a	15.0-	5.3b		60.0a		2.3bc		30.0-		15.0-		
NIS	0.25% v/v												
7 Oust	0.5oz wt/a	7.5-	4.3d		55.0c		1.3c		26.3-		7.5-		
Accord XRT II	6.5fl oz/a												
NIS	0.25% v/v												
LSD P=Various	12.04		0.59		3.37		3.33		17.16		14.39		
Standard Deviation	8.10		0.40		2.27		2.24		11.55		9.69		
CV	63.92		8.03		3.9		79.44		40.18		69.55		
Levene's F	0.617		1.333		2.00		0.53		0.878		0.567		
Levene's Prob(F)	0.715		0.286		0.111		0.779		0.528		0.752		
Skewness	1.1105*		0.0271		-1.3021*		2.2676*		0.4077		1.1843*		
Kurtosis	-0.0434		-0.2948		0.8894		7.771*		-0.625		0.1295		
Mean Sep. Test	LSD.05		LSD.05		LSD.05		LSD.05		LSD.05		LSD.05		
Replicate F	2.914		0.825		2.077		1.581		0.292		2.879		
Replicate Prob(F)	0.0626		0.4971		0.1391		0.2288		0.8305		0.0646		
Treatment F	0.680		8.100		2.769		4.905		0.578		0.653		
Treatment Prob(F)	0.6680		0.0002		0.0436		0.0039		0.7433		0.6874		

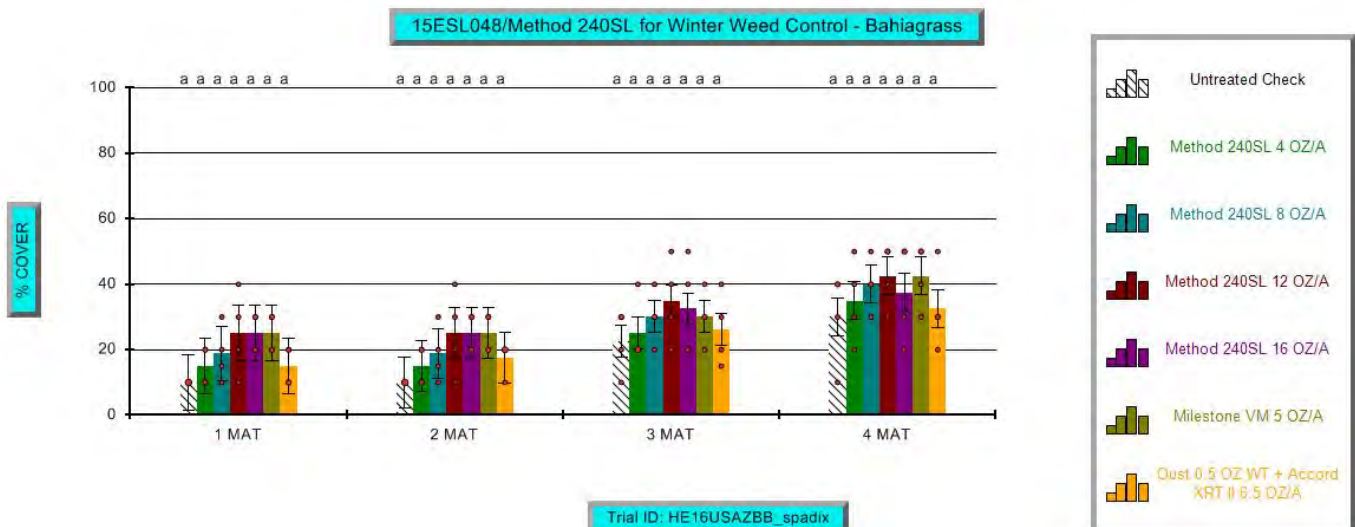
Chart 111. Smooth brome grass (*Bromus inermis*) cover through 3 MAT (91 DAT).



Method 240SL for Winter Weed Control – Venus’s Comb (Continued)

Pest Type	W Weed			
Pest Name	Overall			
Crop Code			PASNO	CYNDA
Crop Scientific Name			Paspalum notat>	Cynodon dactyl>
Crop Name			Water couch	Dog's-tooth gr>
Rating Date	Jul-6-2016		Jul-6-2016	Jul-6-2016
Rating Type	GROUND		GROUND	GROUND
Rating Unit	%AREA		%AREA	%AREA
Number of Subsamples	1		1	1
Days After First/Last Applic.	120 120		120 120	120 120
Trt-Eval Interval	120 DA-A		120 DA-A	120 DA-A
ARM Action Codes	L05		L05	L05
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code	25*	26*
1 Untreated Check			60.0a	30.0-
2 Method 240SL	0.118l/a		58.8ab	35.0-
NIS	0.25% v/v			18.8-
3 Method 240SL	0.237l/a		58.8ab	40.0-
NIS	0.25% v/v			11.3-
4 Method 240SL	0.355l/a		56.3bc	42.5-
NIS	0.25% v/v			12.5-
5 Method 240SL	0.473l/a		58.8ab	37.5-
NIS	0.25% v/v			20.0-
6 Milestone	0.207l/a		60.0a	42.5-
NIS	0.25% v/v			12.5-
7 Oust	0.5oz wt/a		55.0c	32.5-
Accord XRT II	6.5fl oz/a			16.3-
NIS	0.25% v/v			
LSD P=Various			3.37	17.46
Standard Deviation			2.27	11.75
CV			3.9	31.64
Levene's F			2.00	0.50
Levene's Prob(F)			0.111	0.801
Skewness			-1.3021*	-0.4912
Kurtosis			0.8894	-0.5375
Mean Sep. Test			LSD.05	LSD.05
Replicate F			2.077	1.241
Replicate Prob(F)			0.1391	0.3240
Treatment F			2.769	0.690
Treatment Prob(F)			0.0436	0.6608

Chart 112. Bahiagrass (*Paspalum notatum*) cover through 4 MAT (120 DAT).



Method 240SL for Winter Weed Control – Venus’s Comb (Continued)

Chart 113. Bahiagrass (*Paspalum notatum*) color (discoloration) through 2 MAT (59 DAT).

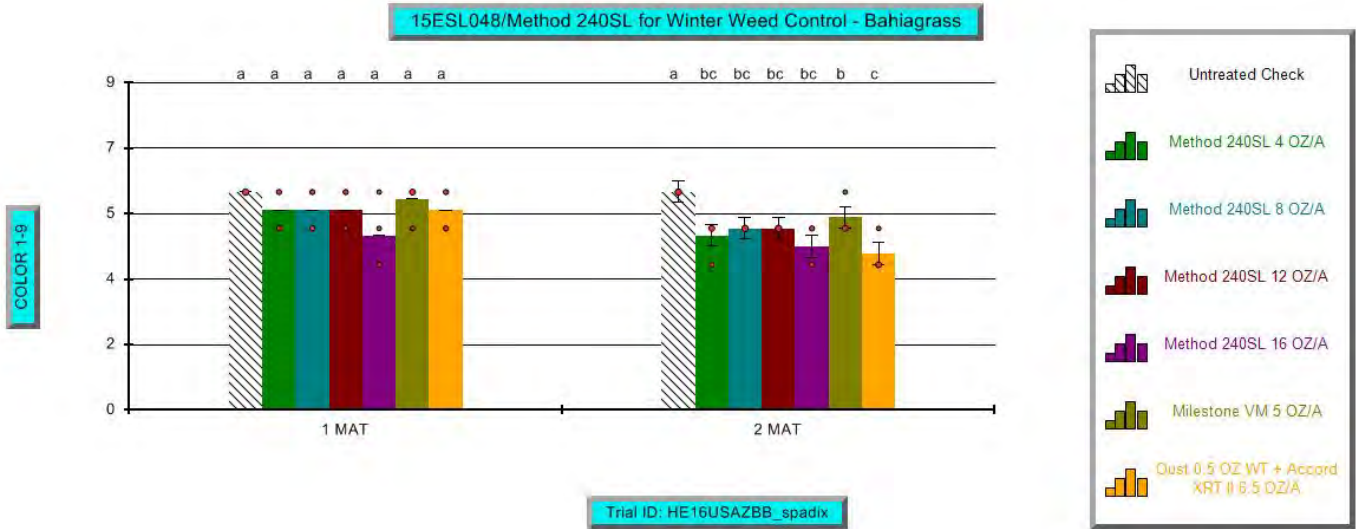
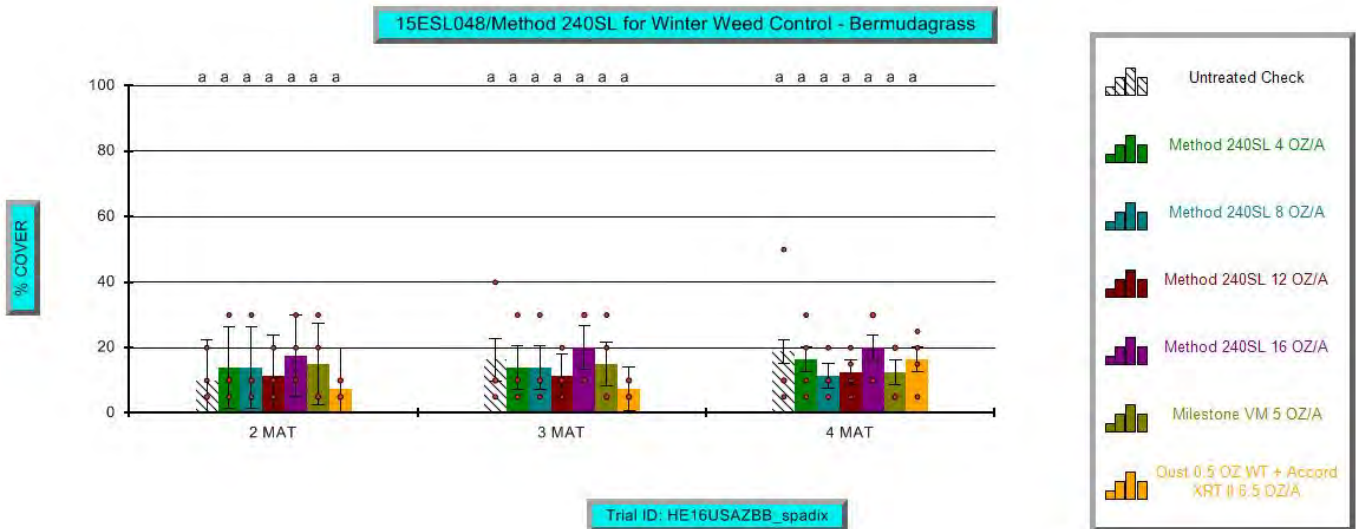


Chart 114. Bermudagrass (*Cynodon dactylon*) cover through 4 MAT (120 DAT).



Evaluation of Finale for Annual Ryegrass Control

General Trial Information

Trial ID:15ESL049	Location:Starkville	Trial Year:2016
Protocol ID:HE16USAZBE	Investigator:Victor Maddox	
Project ID:	Study Director:JByrd	
	Sponsor Contact:Jason Belcher	

Trial Location

City:Starkville	Country:USA United States
State/Prov.:Mississippi	
Postal Code:39759	

Directions:

Plant Science Research Center (North Farm) at Mississippi State University. End of Turf Grass Science Research Area.

Conducted Under No
GLP:

Conducted Under Yes
GEP:

Results and Discussion:

At initiation, ryegrass (*Lolium multiflorum*) accounted for all or nearly all green cover in the study (Chart 114). The study site was chosen because the ryegrass was ALS resistant (imazapyr).

Annual Ryegrass Control. Significant control was observed at 30 DAT, particularly for treatments with Finale (Chart 115). The lowest rate of Finale, Method plus Esplanade, Accord XRT II, and Accord XRT II plus Oust treatments were not as effective at 30 DAT. This trend was similar at 61 DAT, but regrowth was observed and control was reduced. This illustrated a recovery trend and that the best control was already observed at 30 DAT. Despite significant control in the study, the best control was only 53.3% on average using the highest rate of Finale. Interestingly, the best control obtained by the standard treatment (Accord XRT II plus Oust) was 5% on average. This illustrates the ALS resistance in the ryegrass on the site and why it could be a significant problem on roadsides in Mississippi, when present.

Annual Ryegrass Height. Ryegrass height was inversely reflective of ryegrass control in the study (Chart 116). As control went up, height went down. Thus, much of the control was burndown and not actual death of ryegrass plants. This is reflected in overall cover (Chart 114). For example, 53.3% kill would result in less than 30% percent cover for plots with around 80% ryegrass cover at the time of application. However, no average plot cover never fell below 50% during the study. This resulted in faster recovery of ryegrass following herbicide application.

Overall Conclusions. Finale was not effective at the rates used in this study for controlling annual ryegrass. Higher rates and/or different combinations would likely be required for effective control. The poor ryegrass response to the standard treatment (Accord XRT II plus Oust) in this study does illustrate the need to identify non-ALS herbicides for annual ryegrass control in Mississippi. Using this standard treatment for annual ryegrass control would likely be a waste of MDOT time and resources if ALS is present.

Evaluation of Finale for Annual Ryegrass Control (Continued)

Site and Design

Treated Plot
Width: 4 m

Treated Plot
Length: 6 m

Treated Plot
Area: 24 m² Treatments 10

Replications: 4

Study Design: RACOBL Randomized Complete Block (RCB)

Application Description

	A
Application Date:	Mar-9-2016
Appl. Start Time:	11:15 AM
Application Method:	SPRAY
Application Timing:	NCPOPE
Application Placement:	FOLIAR
Applied By:	VMaddox
Air Temperature, Unit:	72 F
% Relative Humidity:	65
Wind Velocity, Unit:	8 MPH
Wind Direction:	SE
Dew Presence (Y/N):	N no
Soil Moisture:	NORMAL
% Cloud Cover:	70

Application Equipment

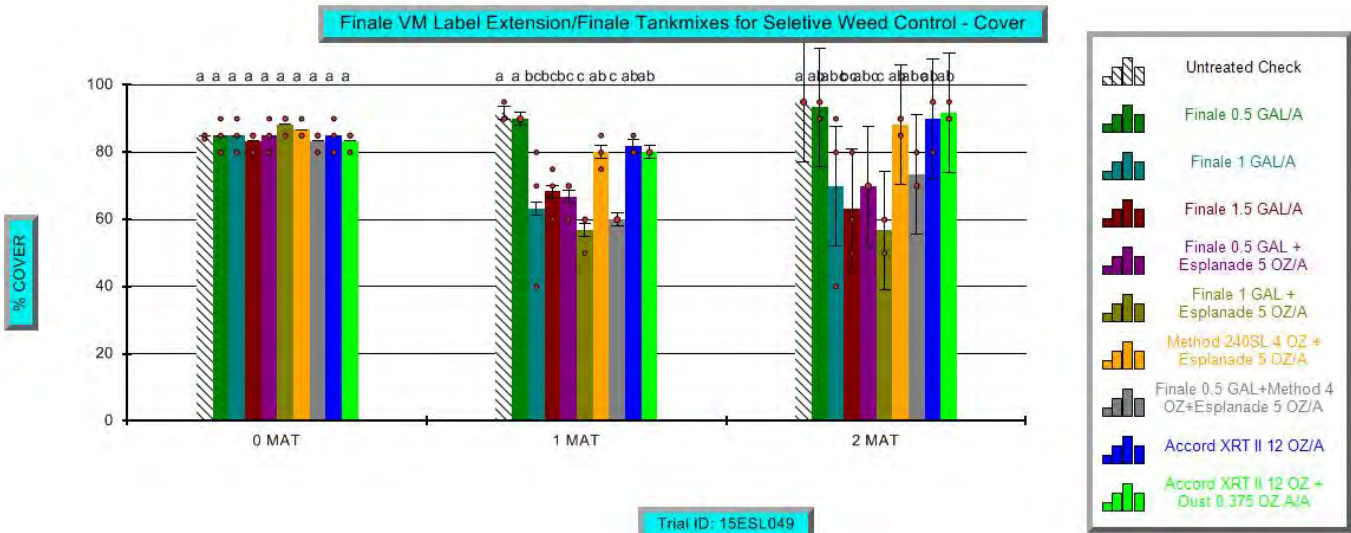
	A
Equipment Type:	BACCAI
Operation Pressure, Unit:	25 PSI
Nozzle Type:	FLLOPR
Nozzle Size:	8003
Nozzle Spacing, Unit:	19 IN
Nozzles/Row:	4
Boom Length, Unit:	6 FT
Boom Height, Unit:	3 FT
Ground Speed, Unit:	2 MPH
Carrier:	WATER
Spray Volume, Unit:	20 GAL/AC
Mix Size, Unit:	1.796
Tank Mix (Y/N):	Y yes

Reps: 4 Appl Code: _ Plots: 4 by 6 meters
 Spray vol: 20 GAL/AC

Evaluation of Finale for Annual Ryegrass Control (Continued)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Spray Volume	Volume Unit	Amt Product to Measure	Rep 1	2	3	4
1	Untreated Check										101	203	306	405
2	Finale		1LBA/GAL	SC	1.89l/a				20GAL/AC	44.84 mL/mx	102	205	310	404
	NIS	100%		SL	0.304l/a				20GAL/AC	7.212 mL/mx				
3	Finale		1LBA/GAL	SC	3.78l/a				20GAL/AC	89.67 mL/mx	103	201	305	402
	NIS	100%		SL	0.304l/a				20GAL/AC	7.212 mL/mx				
4	Finale		1LBA/GAL	SC	5.7l/a				20GAL/AC	135.2 mL/mx	104	202	301	407
	NIS	100%		SL	0.304l/a				20GAL/AC	7.212 mL/mx				
5	Finale		1LBA/GAL	SC	1.89l/a				20GAL/AC	44.84 mL/mx	105	204	309	410
	Esplanade	1.66666663	LBA/GAL	SC	0.148l/a				20GAL/AC	3.511 mL/mx				
	NIS	100%		SL	0.304l/a				20GAL/AC	7.212 mL/mx				
6	Finale		1LBA/GAL	SC	3.78l/a				20GAL/AC	89.67 mL/mx	106	207	303	401
	Esplanade	1.66666663	LBA/GAL	SC	0.148l/a				20GAL/AC	3.511 mL/mx				
	NIS	100%		SL	0.304l/a				20GAL/AC	7.212 mL/mx				
7	Method 240SL		2LBA/GAL	SL	0.118l/a				20GAL/AC	2.799 mL/mx	107	208	307	409
	Esplanade	1.66666663	LBA/GAL	SC	0.148l/a				20GAL/AC	3.511 mL/mx				
	NIS	100%		SL	0.304l/a				20GAL/AC	7.212 mL/mx				
8	Finale		1LBA/GAL	SC	1.89l/a				20GAL/AC	44.84 mL/mx	108	210	308	406
	Method 240SL		2LBA/GAL	SL	0.118l/a				20GAL/AC	2.799 mL/mx				
	Esplanade	1.66666663	LBA/GAL	SC	0.148l/a				20GAL/AC	3.511 mL/mx				
	NIS	100%		SL	0.304l/a				20GAL/AC	7.212 mL/mx				
9	Accord XRT II	5.0700001	7LBA/GAL	XL	0.355l/a				20GAL/AC	8.422 mL/mx	109	206	302	408
	NIS	100%		SL	0.304l/a				20GAL/AC	7.212 mL/mx				
10	Accord XRT II	5.0700001	7LBA/GAL	XL	0.355l/a				20GAL/AC	8.422 mL/mx	110	209	304	403
	Oust	75%AW/W		WG	0.5oz wt/a				20GAL/AC	0.3363 g/mx				
	NIS	100%		SL	0.304l/a				20GAL/AC	7.212 mL/mx				

Chart 114. Overall cover through 2 MAT (61 DAT) following herbicide applications on March 9, 2016.



Evaluation of Finale for Annual Ryegrass Control (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Name	Lolium multifl>	Overall	Lolium multifl>	Overall	Lolium multifl>	Lolium multifl>	Overall
Rating Date	Mar-9-2016	Mar-9-2016	Apr-8-2016	Apr-8-2016	Apr-8-2016	May-9-2016	May-9-2016
Rating Type	GROUND	GROUND	CONTRO	GROUND	HEIGHT	CONTRO	GROUND
Rating Unit	%AREA	%AREA	%UNCK	%AREA	cm	%UNCK	%AREA
Number of Subsamples	1	1	1	1	1	1	1
Days After First/Last Applic.	0 0	0 0	30 30	30 30	30 30	61 61	61 61
Trt-Eval Interval	0 DA-A	0 DA-A	30 DA-A	30 DA-A	30 DA-A	61 DA-A	61 DA-A
ARM Action Codes			EC L05E	L05	L05	EC L05E	L05
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	1*	2*	3*	4*	5*
1Untreated Check			83.3	84.7	0.0	91.7a	49.7a
2Finale	1.89l/a		85.0	85.0	1.7c	90.0a	42.3ab
NIS	0.304l/a						1.7c
3Finale	3.78l/a		85.0	85.0	40.0ab	63.3c	28.3cde
NIS	0.304l/a						30.0a
4Finale	5.7l/a		83.3	83.3	36.7ab	68.3bc	29.3cde
NIS	0.304l/a						35.0a
5Finale	1.89l/a		85.0	85.0	36.7ab	66.7c	24.0e
Esplanade	0.148l/a						30.0a
NIS	0.304l/a						70.0cd
6Finale	3.78l/a		88.3	88.3	53.3a	56.7c	25.0de
Esplanade	0.148l/a						43.3a
NIS	0.304l/a						56.7d
7Method 240SL	0.118l/a		86.7	86.7	10.0c	80.0ab	35.7bc
Esplanade	0.148l/a						6.7bc
NIS	0.304l/a						88.3abc
8Finale	1.89l/a		83.3	83.3	33.3b	60.0c	27.7de
Method 240SL	0.118l/a						26.7ab
Esplanade	0.148l/a						73.3bcd
NIS	0.304l/a						
9Accord XRT II	0.355l/a		85.0	85.0	5.0c	81.7a	30.0cde
NIS	0.304l/a						1.7c
10Accord XRT II	0.355l/a		83.3	83.3	5.0c	80.0ab	32.3cd
Oust	0.5oz wt/a						3.3c
NIS	0.304l/a						91.7ab
LSD P=Various			6.87	6.59	19.13	13.09	7.52
Standard Deviation			4.00	3.84	11.05	7.63	4.38
CV			4.72	4.52	44.87	10.34	13.51
Levene's F			0.267	0.444	1.205	1.347	0.638
Levene's Prob(F)			0.977	0.894	0.35	0.276	0.752
Skewness			0.0496	0.0299	0.5153	-0.5255	0.8482
Kurtosis			-0.9537	-0.8022	-0.8507	-0.2932	0.1725
Mean Sep. Test					LSD.05	LSD.05	LSD.05
Replicate F			0.364	0.611	0.736	1.302	0.335
Replicate Prob(F)			0.6998	0.5535	0.4948	0.2964	0.7198
Treatment F			0.514	0.504	9.022	7.983	10.183
Treatment Prob(F)			0.8453	0.8530	0.0001	0.0001	0.0001

Evaluation of Finale for Annual Ryegrass Control (Continued)

Pest Type	W Weed
Pest Name	Lolium multifidum
Rating Date	May-9-2016
Rating Type	HEIGHT
Rating Unit	cm
Number of Subsamples	1
Days After First/Last Applic.	61 61
Trt-Eval Interval	61 DA-A
ARM Action Codes	L05
Trt Treatment	Rate Appl
No. Name	Rate Unit Code
1Untreated Check	104.7a
2Finale	1.89/a
NIS	0.304/a
3Finale	3.78/a
NIS	0.304/a
4Finale	5.7/a
NIS	0.304/a
5Finale	1.89/a
Esplanade	0.148/a
NIS	0.304/a
6Finale	3.78/a
Esplanade	0.148/a
NIS	0.304/a
7Method 240SL	0.118/a
Esplanade	0.148/a
NIS	0.304/a
8Finale	1.89/a
Method 240SL	0.118/a
Esplanade	0.148/a
NIS	0.304/a
9Accord XRT II	0.355/a
NIS	0.304/a
10Accord XRT II	0.355/a
Oust	0.5oz wt/a
NIS	0.304/a
LSD P=Various	15.91
Standard Deviation	9.27
CV	11.82
Levene's F	0.234
Levene's Prob(F)	0.985
Skewness	0.3672
Kurtosis	-0.1446
Mean Sep. Test	LSD.05
Replicate F	2.140
Replicate Prob(F)	0.1466
Treatment F	5.764
Treatment Prob(F)	0.0008

Evaluation of Finale for Annual Ryegrass Control (Continued)

Chart 115. Annual ryegrass (*Lolium multiflorum*) control through 2 MAT (61 DAT) following herbicide applications on March 9, 2016.

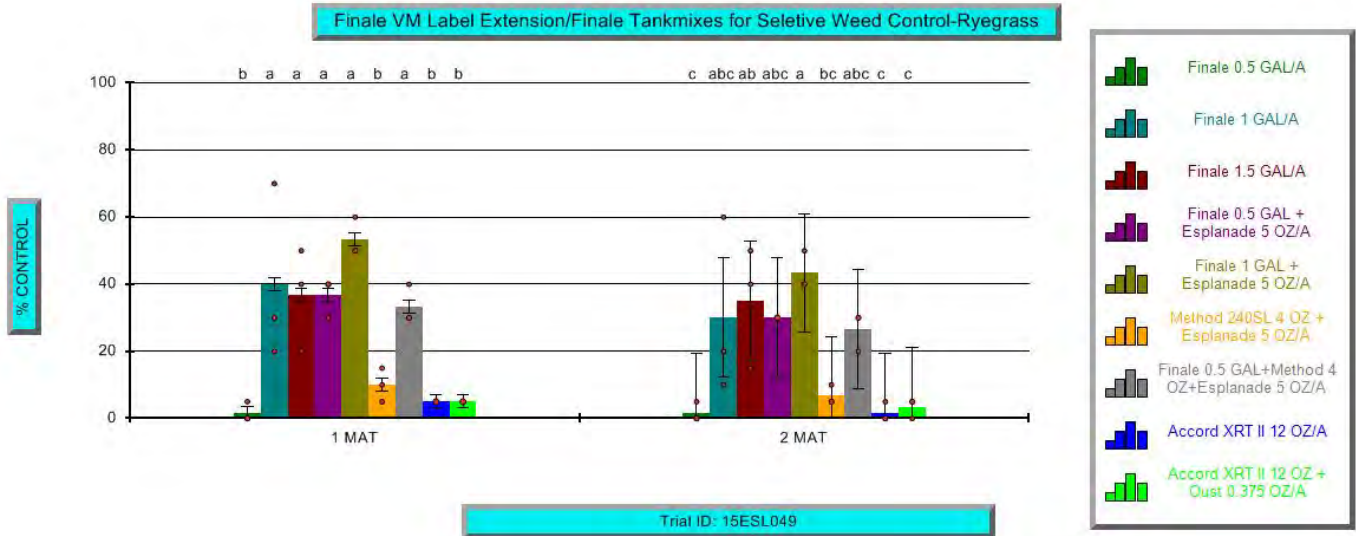
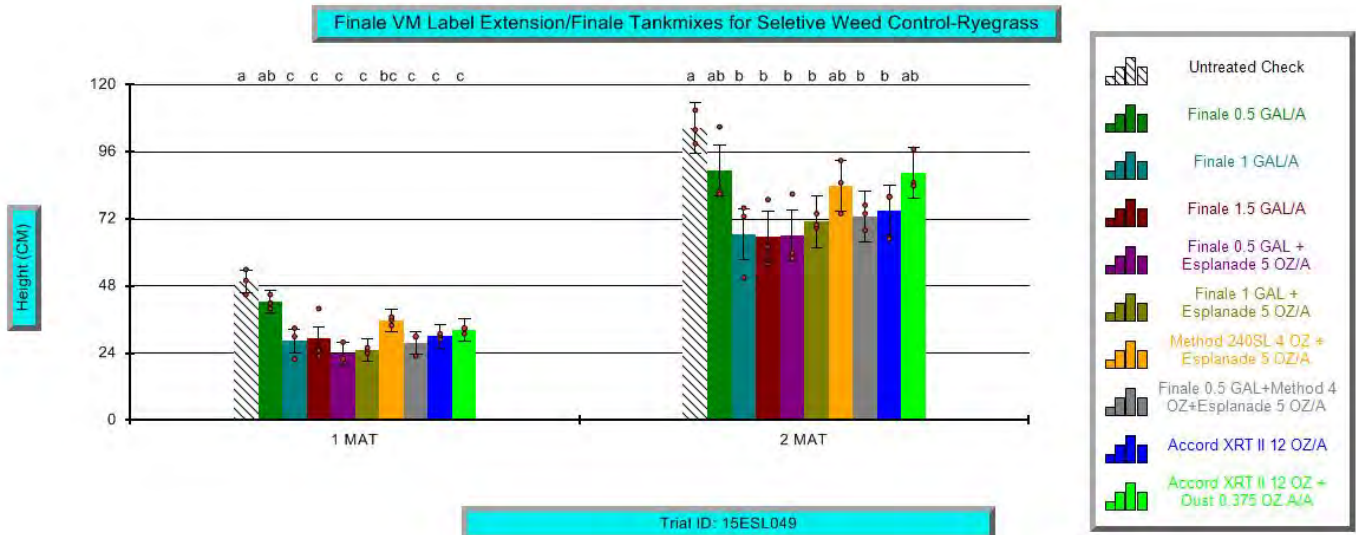


Chart 116. Annual ryegrass (*Lolium multiflorum*) height (cm) through 2 MAT (61 DAT) following herbicide applications on March 9, 2016.



Esplanade & Method for Winter Weed Control – Application A

Trial ID:HE16USAICI	Location: Artesia	Trial Year:2016
Protocol ID:HE16USAICI	Investigator:Belcher, Jason	
Project ID:LOCAL_PROJ	Study Director:Victor Maddox	
	Sponsor Contact:Belcher, Jason	

Trial Location

City:Artesia	Country:USA	United States
State/Prov.:Mississippi		

Latitude of LL Corner °:33.36209 N
Longitude of LL Corner °:88.64124 W

Directions:

Across from old Holcomb cement plant on west side of Hwy 45 South of Artesia, MS. Lowndes County.

Conducted Under
GLP: No

Conducted Under
GEP: No

Objectives: Evaluate Esplanade & Method tank-mixes in MDOT vegetation management control of cool season grasses and broadleaves on highway roadsides. Target August / September applications prior to the emergence of winter annual broadleaves and grasses (e.g. PREEMERGENCE). Target September / October applications after the emergence of winter annual broadleaves and grasses. This study includes two separate applications (**A** and **B**), which will be discussed separately with an overall conclusion following **Applications B**.

Results and Discussion:**Application A (first application)**

Green percent cover was around 70% at initiation (0 MAT) with about 50% bermudagrass. Differences among plots were not significant at 0 MAT or at 1 MAT (Chart 117). There was a significant decrease in green cover by 2, 3, and 4 MAT. Both Esplanade plus Method combinations had less green cover compared to the standard and check treatments. This is reflected in significantly better control of annual ryegrass and buckhorn plantain. Frost damage on bahiagrass and bermudagrass was observed at 1 MAT (Nov 24, 2016). On this date, southern crabgrass (*Digitaria ciliaris*) and knotroot foxtail (*Setaria parviflora*; syn. *S. geniculata*) had senesced. No ryegrass germination was observed at 1 MAT. This was probably due to a severe late-season drought.

By 6 MAT, bahiagrass (Chart 118) and bermudagrass (Chart 119) were greened up. At this point, bermudagrass cover was significantly higher in Esplanade plus Method plots compared to the check. Bahiagrass cover was also higher, but not significant. Some bahiagrass (Chart 120) and bermudagrass (Chart 121) discoloration was observed during the study. Significant bermudagrass discoloration was observed at 4 MAT on bermudagrass during greenup. Bermudagrass discoloration was not significant after 4 MAT. All herbicide treatments showed significant bahiagrass discoloration at 6 MAT during greenup. Despite the discoloration, cover for both turf species were higher in the Esplanade plus Method treatments.

Annual ryegrass (*Lolium multiflorum*) control was significantly higher in the Esplanade plus Method treatments compared to the standard and check treatment at 2, 3, and 4, and 6 MAT (essentially throughout the study) (Chart 122). Smooth brome (*Bromus inermis*) ratings were initiated at 4 MAT (Chart 123). Esplanade plus method treatments showed significantly more control of smooth broom at 4 and 6 MAT compared to the standard and check treatments.

Buckhorn plantain (*Plantago lanceolata*) control was significantly higher in Esplanade plus Method treatments at 2 and 3 MAT (Chart 124). At 4 and 6 MAT, control was significantly higher than the standards and check treatments, but the higher rate was significantly better than the lower rate.

Hairy pea (*Lathyrus hirsutus*) ratings were started at 3 MAT during the study (Chart 125). Control was significantly higher in the Esplanade plus Method treatments at 3, 4, and 6 MAT compared to the standard and check treatments,

Esplanade & Method for Winter Weed Control (Continued)

Results and Discussion (Continued):

Application A (first application) (Continued)

In conclusion, Esplanade plus Method were effective in releasing the turf and in most parameters were better than the standard herbicide treatment. Annual ryegrass, smooth brome, buckhorn plantain, and hairy pea all showed good response to the treatments. The only possible issue is the significantly higher cover of knotroot foxtail at 8 MAT (Chart 126). It is unclear if it was a lack of Esplanade residual, knotroot foxtail perenniated at the site, or Esplanade lacks PRE activity on knotroot foxtail. Esplanade did seem to have some activity on southern crabgrass since cover was lower in both treatments with Esplanade (Chart 127). However, crabgrass cover was low and a denser population would be more desirable for conclusive results. A similar trend was observed in tall fescue (*Schedonorus arundinaceus*) at 12 MAT (Chart 128). However, tall fescue is also perennial. Thus, more study is needed with both southern crabgrass and tall fescue. The same for showy evening primrose (*Oenothera speciosa*) and white heath aster (*Symphotrichum pilosum*), but there was a trend of lower cover for both species in plots treated with Esplanade plus Method.

As a note, the overall cover is provided in this study. This rating includes both dead and living material above the soil surface. This can be important where soils erosion on slopes is a concern. Despite significant loss in green cover early in the study, overall cover was little changed. Thus, soil erosion should be less of a concern under the conditions in this study.

Site and Design

Treated Plot
Width: 6 FT

Treated Plot
Length: 30 FT

Treated Plot
Area: 180 FT² Treatments: 8

Replications: 3

Study: RACOB Randomized Complete Block
Design: L (RCB)

Application Description

	A	B
Application Date:	Oct-24-2016	Jan-26-2017
Appl. Start Time:	10:00 AM	10:30 AM
Interval to Prev. Appl., Unit:		94 DAYS
Application Method:	SPRAY	SPRAY
Application Timing:	POSPRE	POSPRE
Application Placement:	FOLIAR	FOLIAR
Applied By:	VMaddox	VMaddox
Air Temperature, Unit:	62 F	47 F
% Relative Humidity:	65	45
Wind Velocity, Unit:	3 MPH	5 MPH
Wind Direction:	NE	N
Dew Presence (Y/N):	N no	N no
Soil Moisture:	DRY	NORMAL
% Cloud Cover:	60	10

Esplanade & Method for Winter Weed Control (Continued)

Application Equipment

	A	B
Equipment Type:	BACCAI	BACCAI
Operation Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	FLAFAN	
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	4 FT	4 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	WATER	WATER
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 L	2 L
Tank Mix (Y/N):	Y yes	Y yes

Reps: 3 Appl Code: A Plots: 6 by 30 feet
 Spray vol: 25 GAL/AC

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate Unit	Appl Code	Spray Volume	Volume Unit	Amt Product to Measure	Rep 1	2	3
2	ESPLANADE	1.66666663	LBA/GAL	SC	0.73oz ai/a	A	25GAL/AC	25GAL/AC	2.19 mL/mx	102	204	305
	METHOD 240SL		2LBA/GAL	SL	1oz ai/a	A	25GAL/AC	25GAL/AC	2.5 mL/mx			
	NIS		100%AW/W	XL	0.25% v/v	A	25GAL/AC	25GAL/AC	4.999 mL/mx			
3	ESPLANADE	1.66666663	LBA/GAL	SC	1.04oz ai/a	A	25GAL/AC	25GAL/AC	3.12 mL/mx	103	205	308
	METHOD 240SL		2LBA/GAL	SL	2oz ai/a	A	25GAL/AC	25GAL/AC	4.999 mL/mx			
	NIS		100%AW/W	XL	0.25% v/v	A	25GAL/AC	25GAL/AC	4.999 mL/mx			
7	MILESTONE VM		2LBA/GAL	XL	5oz/a	A	25GAL/AC	25GAL/AC	3.125 mL/mx	107	203	301
	OUST		75%AW/W	WG	0.5oz/a	A	25GAL/AC	25GAL/AC	0.2996 g/mx			
	NIS		100%AW/W	XL	0.25% v/v	A	25GAL/AC	25GAL/AC	4.999 mL/mx			

Reps: 3 Appl Code: B Plots: 6 by 30 feet
 Spray vol: 25 GAL/AC

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate Unit	Appl Code	Spray Volume	Volume Unit	Amt Product to Measure	Rep 1	2	3
4	DERIGO	36.4%	AW/W	WG	1.09oz ai/a	B	25GAL/AC	25GAL/AC	1.794 g/mx	104	202	303
	NIS	100%	AW/W	XL	0.25% v/v	B	25GAL/AC	25GAL/AC	4.999 mL/mx			
5	ESPLANADE	1.66666663	LBA/GAL	SC	0.73oz ai/a	B	25GAL/AC	25GAL/AC	2.19 mL/mx	105	206	304
	DERIGO	36.4%	AW/W	WG	1.09oz ai/a	B	25GAL/AC	25GAL/AC	1.794 g/mx			
	NIS	100%	AW/W	XL	0.25% v/v	B	25GAL/AC	25GAL/AC	4.999 mL/mx			
6	ESPLANADE	1.66666663	LBA/GAL	SC	0.73oz ai/a	B	25GAL/AC	25GAL/AC	2.19 mL/mx	106	208	302
	METHOD 240SL		2LBA/GAL	SL	1oz ai/a	B	25GAL/AC	25GAL/AC	2.5 mL/mx			
	DERIGO	36.4%	AW/W	WG	1.09oz ai/a	B	25GAL/AC	25GAL/AC	1.794 g/mx			
	NIS	100%	AW/W	XL	0.25% v/v	B	25GAL/AC	25GAL/AC	4.999 mL/mx			
8	ACCORD XRT II	5.07	LBA/GAL	XL	0.375qt/a	B	25GAL/AC	25GAL/AC	7.5 mL/mx	108	201	307
	OUST	75%	AW/W	WG	0.5oz wt/a	B	25GAL/AC	25GAL/AC	0.2996 g/mx			
	NIS	100%	AW/W	XL	0.25% v/v	B	25GAL/AC	25GAL/AC	4.999 mL/mx			

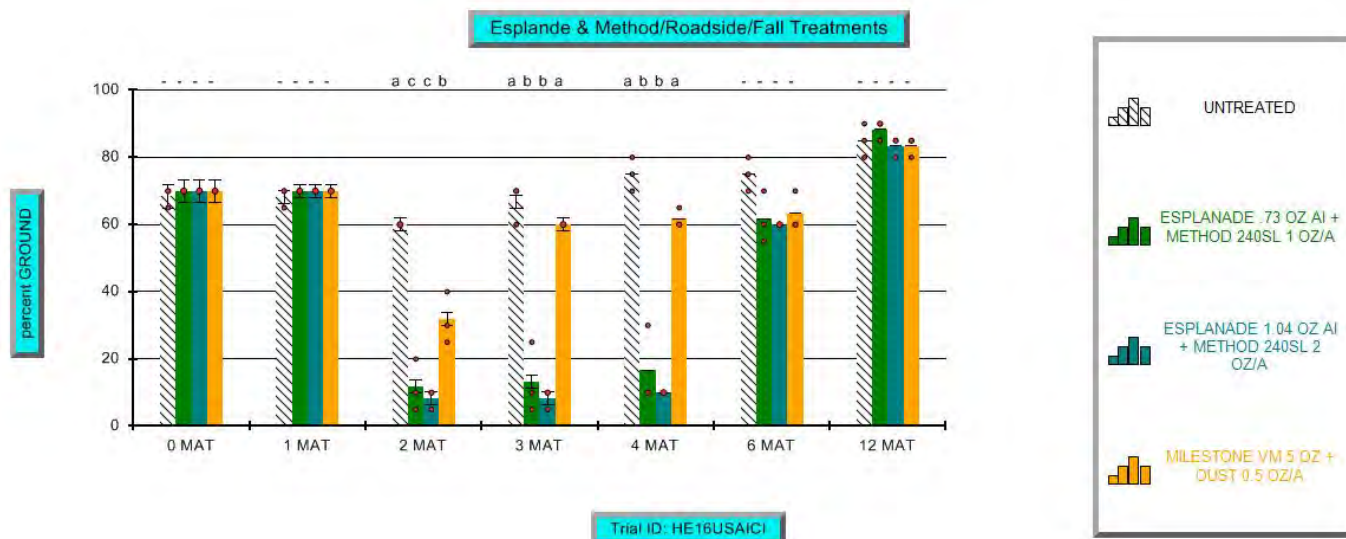
Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate Unit	Appl Code	Spray Volume	Volume Unit	Amt Product to Measure	Rep 1	2	3
1	UNTREATED									101	207	306

Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Overall Green	Cynodon dactyl>	Paspalum notat>	Chaerophyllum >	Setaria genicu>	Digitaria cili>			
Crop Scientific Name									
Rating Date	Oct-24-2016	Oct-24-2016	Oct-24-2016	Oct-24-2016	Oct-24-2016	Oct-24-2016			
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Unit	percent	percent	percent	percent	percent	percent			
Days After First/Last Applic.	0 0	0 0	0 0	0 0	0 0	0 0			
Trt-Eval Interval	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A			
ARM Action Codes	EC L05	L05	L05	ET4 L05	L05	ET4 L05			
Trt No.	Treatment Name	Rate	Appl Code	1*	2*	3*	4*	5*	6*
1	UNTREATED			68.3-	46.7-	11.7-	10.0-	7.3-	5.0-
2	ESPLANADE METHOD 240SL NIS	0.73oz ai/a 1oz ai/a 0.25% v/v	A A A	70.0-	50.0-	6.7-	10.0-	10.0-	5.0-
3	ESPLANADE METHOD 240SL NIS	1.04oz ai/a 2oz ai/a 0.25% v/v	A A A	70.0-	45.0-	11.7-	10.0-	7.3-	5.0-
7	MILESTONE VM OUST NIS	5oz/a 0.5oz/a 0.25% v/v	A A A	70.0-	50.0-	8.3-	6.7-	8.3-	5.7-
LSD	P=.05			2.88	17.06	13.21	2.88	4.32	1.15
Standard Deviation				1.44	8.54	6.61	1.44	2.16	0.58
CV				2.07	17.82	69.02	15.75	26.18	11.17
Bartlett's X2				0.0	0.315	1.651	0.0	0.046	0.0
P(Bartlett's X2)				.	0.854	0.648	.	0.977	.
Skewness				-3.4641*	-0.4032	1.018	-2.0552*	-0.6545	3.4641*
Kurtosis				12.0*	-0.6746	-0.3238	2.64*	-1.5914	12.0*
Replicate F				1.000	3.971	0.619	1.000	1.500	1.000
Replicate Prob(F)				0.4219	0.0797	0.5696	0.4219	0.2963	0.4219
Treatment F				1.000	0.257	0.429	4.000	1.018	1.000
Treatment Prob(F)				0.4547	0.8538	0.7400	0.0701	0.4481	0.4547

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 117. Overall cover through 12 MAT following herbicide applications on October 24, 2016.

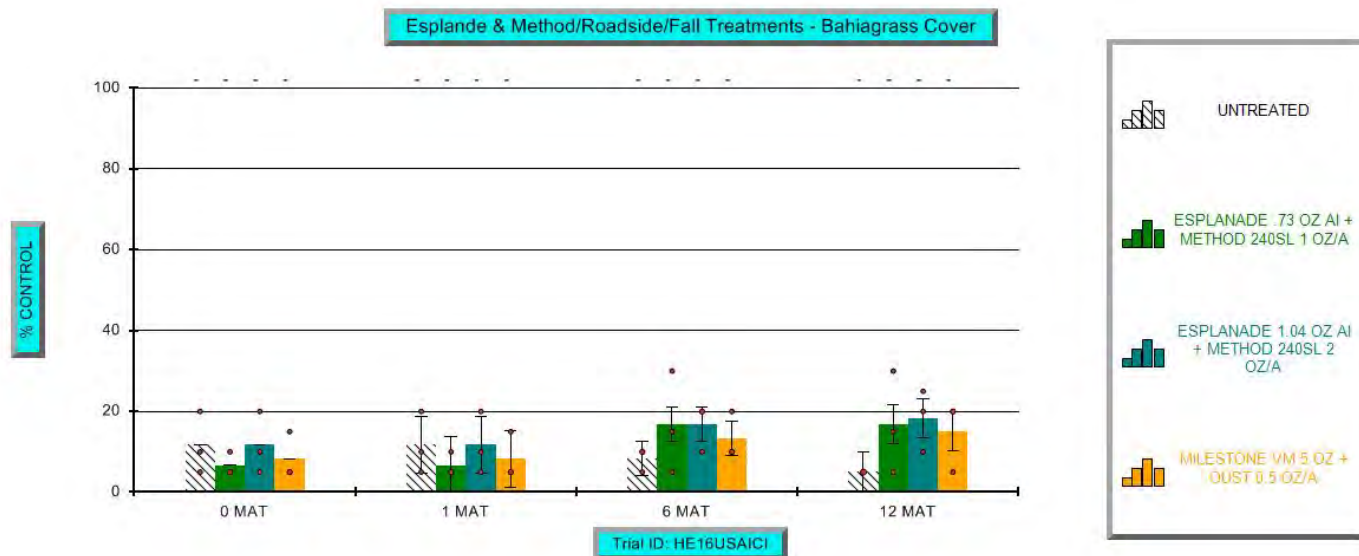


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Plantago lance>	Overall Green	Cynodon dactyl>	Paspalum notat>	Plantago lance>	Overall Cover		
Crop Scientific Name								
Rating Date	Oct-24-2016	Nov-24-2016	Nov-24-2016	Nov-24-2016	Nov-24-2016	Dec-23-2016		
Rating Type	GROUND	GROUND	GROUND	GROUND	CONTRO	GROUND		
Rating Unit	percent	percent	percent	percent	percent	percent		
Days After First/Last Applic.	0 0	31 31	31 31	31 31	31 31	60 60		
Trt-Eval Interval	0 DA-A	31 DA-A	31 DA-A	31 DA-A	31 DA-A	60 DA-A		
ARM Action Codes	L05	EC L05	L05	L05	EC L05E	L05		
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	7*	8*	9*	10*	11*	12*
1UNTREATED			6.7-	68.3-	46.7-	11.7-	0.0	78.3a
2ESPLANADE	0.73oz ai/a	A	8.3-	70.0-	50.0-	6.7-	16.7-	71.7bc
METHOD 240SL	1oz ai/a	A						
NIS	0.25% v/v	A						
3ESPLANADE	1.04oz ai/a	A	7.3-	70.0-	45.0-	11.7-	23.3-	70.0c
METHOD 240SL	2oz ai/a	A						
NIS	0.25% v/v	A						
7MILESTONE VM	5oz/a	A	8.3-	70.0-	50.0-	8.3-	13.3-	76.7ab
OUST	0.5oz/a	A						
NIS	0.25% v/v	A						
LSD P=.05			6.02	2.88	17.06	13.21	11.95	5.52
Standard Deviation			3.01	1.44	8.54	6.61	5.27	2.76
CV			39.31	2.07	17.82	69.02	29.65	3.73
Bartlett's X2			0.047	0.0	0.315	1.651	0.0	0.0
P(Bartlett's X2)			0.997	.	0.854	0.648	.	.
Skewness			-0.1321	-3.4641*	-0.4032	1.018	0.2545	0.3541
Kurtosis			-2.2909	12.0*	-0.6746	-0.3238	-0.0402	-1.4473
Replicate F			0.450	1.000	3.971	0.619	1.600	0.273
Replicate Prob(F)			0.6578	0.4219	0.0797	0.5696	0.3086	0.7703
Treatment F			0.220	1.000	0.257	0.429	2.800	6.182
Treatment Prob(F)			0.8790	0.4547	0.8538	0.7400	0.1736	0.0289

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 118. Bahiagrass (*Paspalum notatum*) cover through 12 MAT following herbicide applications on Oct. 24, 2016.

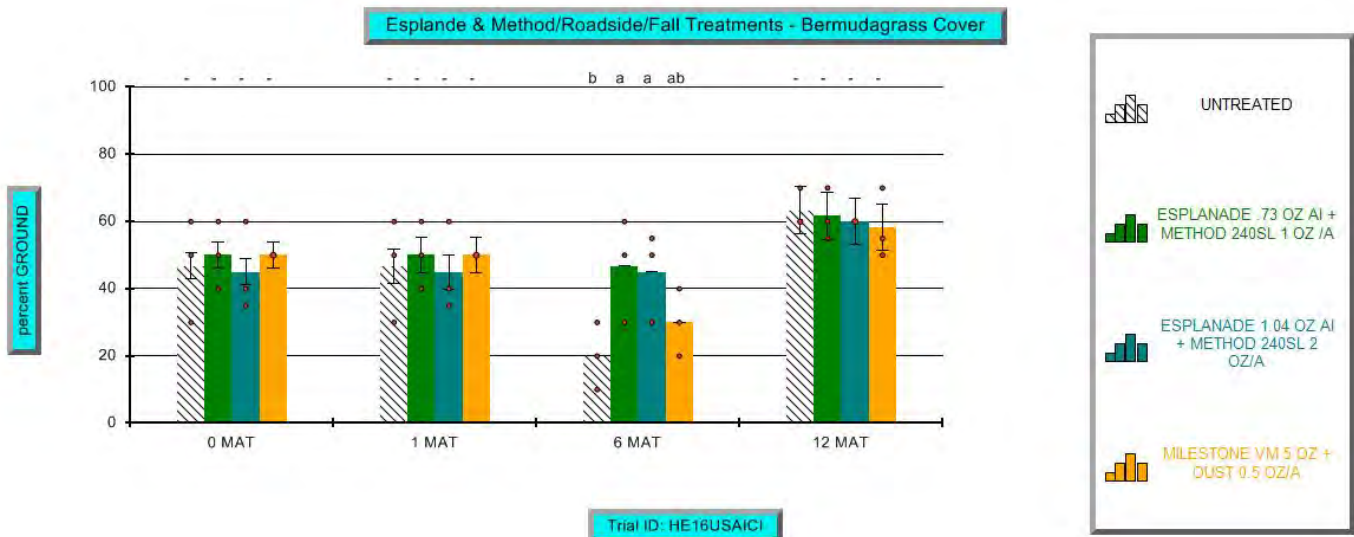


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Overall Green	Plantago lance>	Lolium multifi>	Lolium multifi>	Overall Cover	Overall Green		
Crop Scientific Name								
Rating Date	Dec-23-2016	Dec-23-2016	Dec-23-2016	Dec-23-2016	Jan-23-2017	Jan-23-2017		
Rating Type	GROUND	CONTRO	CONTRO	GROUND	GROUND	GROUND		
Rating Unit	percent	percent	percent	percent	percent	percent		
Days After First/Last Applic.	60 60	60 60	60 60	60 60	91 91	91 91		
Trt-Eval Interval	60 DA-A	60 DA-A	60 DA-A	60 DA-A	60 DA-A	60 DA-A		
ARM Action Codes	L05	EC L05E	AA EC L05E	L05	L05	L05		
Trt Treatment								
No. Name	Rate Unit	Appl Code	13*	14*	15*	16*	17*	18*
1UNTREATED			60.0a	0.0	0.0	6.7-	78.3a	66.7a
2ESPLANADE	0.73oz ai/a	A	11.7c	76.7a	99.8a	8.3-	71.7bc	13.3b
METHOD 240SL	1oz ai/a	A						
NIS	0.25% v/v	A						
3ESPLANADE	1.04oz ai/a	A	8.3c	76.7a	99.8a	6.7-	70.0c	8.3b
METHOD 240SL	2oz ai/a	A						
NIS	0.25% v/v	A						
7MILESTONE VM	5oz/a	A	31.7b	30.0b	29.7b	6.7-	76.7ab	60.0a
OUST	0.5oz/a	A						
NIS	0.25% v/v	A						
LSD P=.05	8.97	19.99	7.95 - 23.65	9.56	5.52	13.42		
Standard Deviation	4.49	8.82	6.13t	4.79	2.76	6.72		
CV	16.08	14.43	8.86t	67.58	3.73	18.12		
Bartlett's X2	1.686	0.756	0.22	2.974	0.0	2.563		
P(Bartlett's X2)	0.43	0.685	0.896	0.396	.	0.278		
Skewness	0.6047	-0.9134	-0.854	0.3251	0.3541	-0.0391		
Kurtosis	-1.298	-1.052	-1.4997	0.3334	-1.4473	-2.2068		
Replicate F	3.207	0.143	0.239	0.636	0.273	0.323		
Replicate Prob(F)	0.1129	0.8711	0.7977	0.5615	0.7703	0.7358		
Treatment F	83.966	28.000	78.369	0.091	6.182	61.831		
Treatment Prob(F)	0.0001	0.0044	0.0006	0.9624	0.0289	0.0001		

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 119. Bermudagrass (*Cynodon dactylon*) cover through 12 MAT following herbicide applications on October 24, 2016.

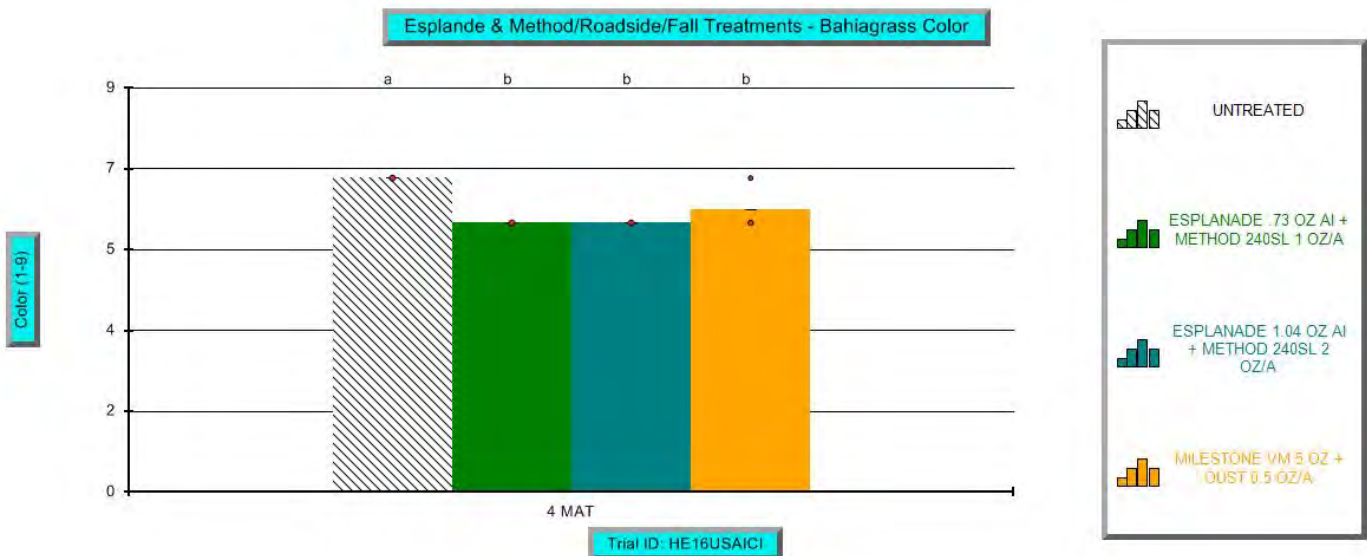


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Plantago lance>	Lolium multifi>	Schedonorus ar>	Lolium multifi>	Lathyrus hirsu>	Overall Green		
Crop Scientific Name								
Rating Date	Jan-23-2017	Jan-23-2017	Jan-23-2017	Jan-23-2017	Jan-23-2017	Feb-21-2017		
Rating Type	CONTRO	CONTRO	GROUND	GROUND	CONTRO	GROUND		
Rating Unit	percent	percent	percent	percent	percent	percent		
Days After First/Last Applic.	91 91	91 91	91 91	91 91	91 91	120 26		
Trt-Eval Interval	60 DA-A	60 DA-A	120 DA-A	60 DA-A	120 DA-A	120 DA-A		
ARM Action Codes	EC L05E	EC L05E	L05	AL L05	EC L05E	L05		
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	19*	20*	21*	22*	23*	24*
1UNTREATED			0.0	0.0	6.7-	23.1a	0.0	75.0a
2ESPLANADE	0.73oz ai/a	A	83.3a	99.3a	8.3-	0.3b	97.0a	16.7b
METHOD 240SL	1oz ai/a	A						
NIS	0.25% v/v	A						
3ESPLANADE	1.04oz ai/a	A	95.0a	99.3a	6.7-	0.3b	97.7a	10.0b
METHOD 240SL	2oz ai/a	A						
NIS	0.25% v/v	A						
7MILESTONE VM	5oz/a	A	23.3b	16.7b	8.3-	28.2a	83.3b	61.7a
OUST	0.5oz/a	A						
NIS	0.25% v/v	A						
LSD P=.05			13.62	8.41	9.27	1.20 - 14.23	6.74	13.63
Standard Deviation			6.01	3.71	4.64	0.15t	2.97	6.82
CV			8.94	5.17	61.86	19.03t	3.21	16.7
Bartlett's X2			0.046	5.875	2.974	4.476	2.636	3.276
P(Bartlett's X2)			0.977	0.053	0.396	0.214	0.268	0.194
Skewness			-0.75	-0.8748	0.0	0.0341	-1.1165	0.0213
Kurtosis			-1.6016	-1.627	0.1497	-2.191	-0.3012	-2.1079
Replicate F			0.538	0.613	0.871	4.270	2.830	0.582
Replicate Prob(F)			0.6208	0.5859	0.4655	0.0703	0.1714	0.5874
Treatment F			122.846	496.000	0.129	83.415	22.226	67.403
Treatment Prob(F)			0.0003	0.0001	0.9394	0.0001	0.0068	0.0001

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 120. Bahiagrass (*Paspalum notatum*) color at 4 MAT following herbicide applications on October 24, 2016

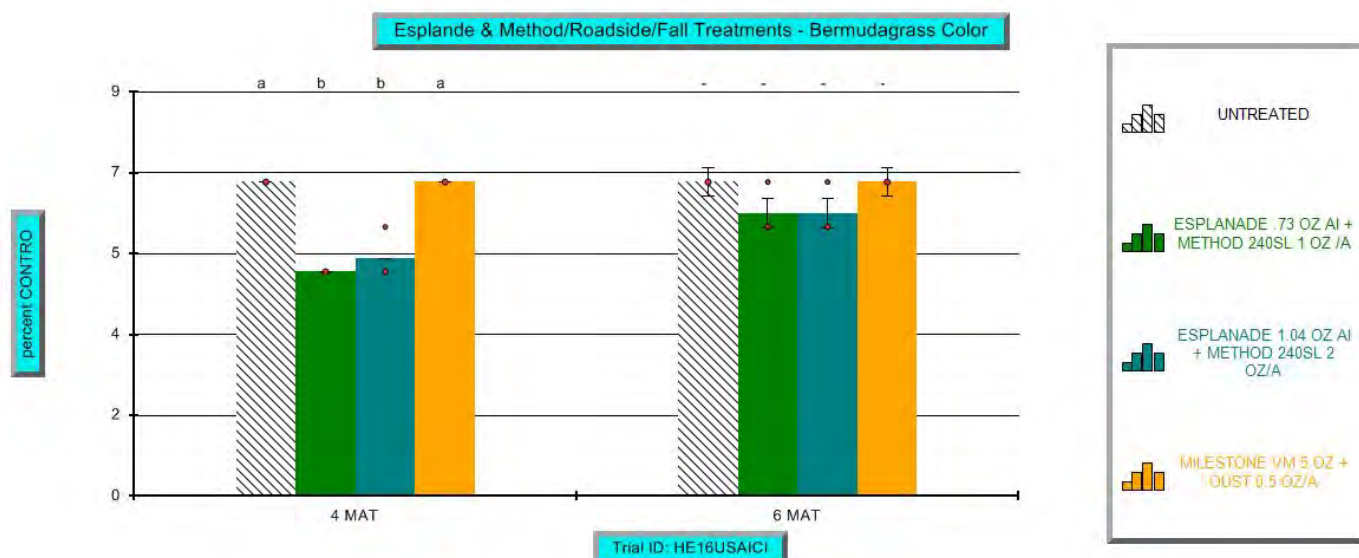


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Overall Cover	Plantago lancea>	Lolium multifl>	Schedonorus ar>	Lolium multifl>	Lathyrus hirsu>		
Crop Scientific Name	Feb-21-2017	Feb-21-2017	Feb-21-2017	Feb-21-2017	Feb-21-2017	Feb-21-2017		
Rating Date	GROUND	CONTRO	CONTRO	GROUND	GROUND	CONTRO		
Rating Type	percent	percent	percent	percent	percent	percent		
Rating Unit	120 26	120 26	120 26	120 26	120 26	120 26		
Days After First/Last Applic.	120 DA-A	120 DA-A	120 DA-A	120 DA-A	120 DA-A	120 DA-A		
Trt-Eval Interval	L05	EC L05E	EC L05E	L05	AL L05	EC L05E		
ARM Action Codes								
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	25*	26*	27*	28*	29*	30*
1UNTREATED			78.3a	0.0	0.0	6.7-	14.0a	0.0
2ESPLANADE	0.73oz ai/a	A	71.7bc	80.0b	99.3a	9.0-	0.3b	97.0a
METHOD 240SL	1oz ai/a	A						
NIS	0.25% v/v	A						
3ESPLANADE	1.04oz ai/a	A	70.0c	95.0a	99.3a	6.7-	0.3b	97.7a
METHOD 240SL	2oz ai/a	A						
NIS	0.25% v/v	A						
7MILESTONE VM	5oz/a	A	76.7ab	20.0c	16.7b	8.3-	15.9a	83.3b
OUST	0.5oz/a	A						
NIS	0.25% v/v	A						
LSD P=.05			5.52	6.54	8.41	8.47	1.66 - 9.62	6.74
Standard Deviation			2.76	2.89	3.71	4.24	0.181	2.97
CV			3.73	4.44	5.17	55.3	28.03	3.21
Bartlett's X2			0.0	0.0	5.875	2.094	3.389	2.636
P(Bartlett's X2)			.	.	0.053	0.553	0.335	0.268
Skewness			0.3541	-0.6981	-0.8748	0.3977	0.3206	-1.1165
Kurtosis			-1.4473	-1.6928	-1.627	-0.3029	-1.4851	-0.3012
Replicate F			0.273	1.000	0.613	0.784	6.487	2.830
Replicate Prob(F)			0.7703	0.4444	0.5859	0.4985	0.0316	0.1714
Treatment F			6.182	567.000	496.000	0.235	36.469	22.226
Treatment Prob(F)			0.0289	0.0001	0.0001	0.8690	0.0003	0.0068

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 121. Bermudagrass (*Cynodon dactylon*) color through 6 MAT following herbicide applications on October 24, 2016.

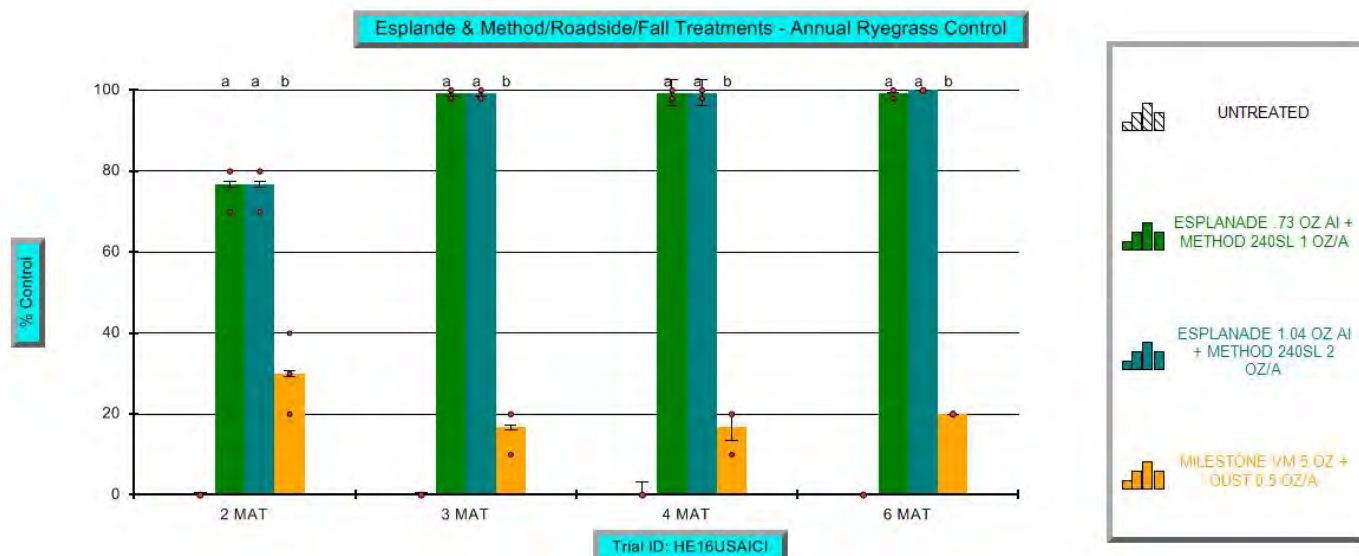


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Cynodon dactyl>	Bromus inermis	Overall Cover	Overall Green	Plantago lance>	Lolium multifi>		
Crop Scientific Name	Feb-21-2017	Feb-21-2017	Apr-21-2017	Apr-21-2017	Apr-21-2017	Apr-21-2017		
Rating Date	COLOR	CONTRO	GROUND	GROUND	CONTRO	CONTRO		
Rating Type	1-9	percent	percent	percent	percent	percent		
Rating Unit	120 26	120 26	179 85	179 85	179 85	179 85		
Days After First/Last Applic.	120 DA-A	120 DA-A	179 DA-A	179 DA-A	179 DA-A	179 DA-A		
Trt-Eval Interval	L05	EC L05E	L05	L05	EC L05E	EC L05E		
ARM Action Codes								
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	31*	32*	33*	34*	35*	36*
1UNTREATED			7.0a	0.0	78.3a	75.0-	0.0	0.0
2ESPLANADE	0.73oz ai/a	A	5.0b	92.0a	71.7bc	61.7-	83.3b	99.3a
METHOD 240SL	1oz ai/a	A						
NIS	0.25% v/v	A						
3ESPLANADE	1.04oz ai/a	A	5.3b	81.7a	70.0c	60.0-	95.0a	100.0a
METHOD 240SL	2oz ai/a	A						
NIS	0.25% v/v	A						
7MILESTONE VM	5oz/a	A	7.0a	16.7b	76.7ab	63.3-	10.0c	20.0b
OUST	0.5oz/a	A						
NIS	0.25% v/v	A						
LSD P=.05			0.58	43.63	5.52	11.04	7.56	1.51
Standard Deviation			0.29	19.25	2.76	5.53	3.33	0.67
CV			4.75	30.34	3.73	8.5	5.31	0.91
Bartlett's X2			0.0	2.16	0.0	0.343	0.038	0.0
P(Bartlett's X2)			.	0.34	.	0.842	0.845	.
Skewness			-0.1916	-1.0514	0.3541	0.7205	-0.7621	-0.8561
Kurtosis			-2.2537	-0.3796	-1.4473	-0.5923	-1.7138	-1.7143
Replicate F			1.000	0.969	0.273	0.818	3.250	1.000
Replicate Prob(F)			0.4219	0.4539	0.7703	0.4851	0.1451	0.4444
Treatment F			41.000	13.507	6.182	4.545	573.250	14281.001
Treatment Prob(F)			0.0002	0.0166	0.0289	0.0548	0.0001	0.0001

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 122. Annual ryegrass (*Lolium multiflorum*) control through 6 MAT following herbicide applications on October 24, 2016.

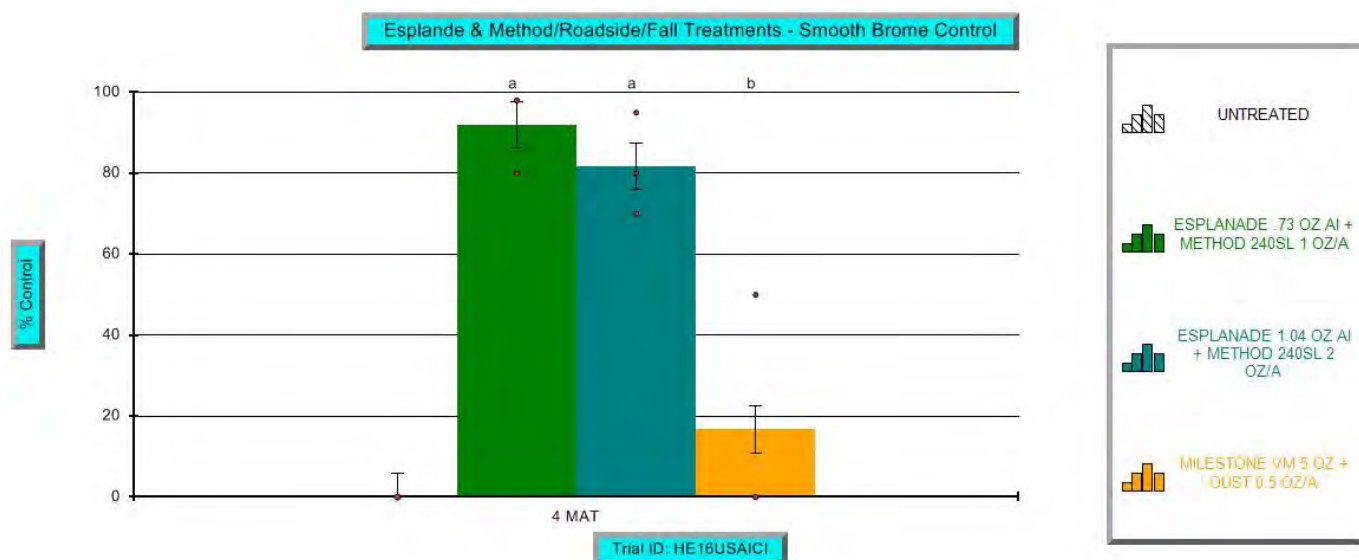


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Schedonorus ar>	Lolium multifl>	Lathyrus hirsu>	Cynodon dactyl>	Bromus inermis
Crop Scientific Name	Apr-21-2017	Apr-21-2017	Apr-21-2017	Apr-21-2017	Apr-21-2017
Rating Date	GROUND	GROUND	CONTRO	COLOR	CONTRO
Rating Type	percent	percent	percent	1-9	percent
Rating Unit	179 85	179 85	179 85	179 85	179 85
Days After First/Last Applic.	179 DA-A	179 DA-A	179 DA-A	179 DA-A	179 DA-A
Trt-Eval Interval	L05	AL L05	ET4 EC L05E	L05	L05
ARM Action Codes					
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code			
1UNTREATED			37*	38*	39*
2ESPLANADE	0.73oz ai/a	A	40*	41*	
METHOD 240SL	1oz ai/a	A			
NIS	0.25% v/v	A			
3ESPLANADE	1.04oz ai/a	A			
METHOD 240SL	2oz ai/a	A			
NIS	0.25% v/v	A			
7MILESTONE VM	5oz/a	A			
OUST	0.5oz/a	A			
NIS	0.25% v/v	A			
LSD P=.05	8.85	2.14 - 12.14	13.09	0.67	22.83
Standard Deviation	4.43	0.22t	5.77	0.33	11.43
CV	57.8	33.57t	6.19	5.0	21.76
Bartlett's X2	1.903	2.254	0.0	0.0	2.838
P(Bartlett's X2)	0.386	0.324	.	.	0.092
Skewness	0.3977	0.3732	-1.5333*	-0.8124	-0.1254
Kurtosis	-0.3029	-1.5631	1.2571	-1.65	-2.2732
Replicate F	0.208	4.145	1.000	3.000	1.340
Replicate Prob(F)	0.8179	0.0740	0.4444	0.1250	0.3302
Treatment F	0.385	30.388	12.000	4.000	65.085
Treatment Prob(F)	0.7682	0.0005	0.0204	0.0701	0.0001

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 123. Smooth brome grass (*Bromus inemis*) control through 6 MAT following herbicide applications on October 24, 2016.

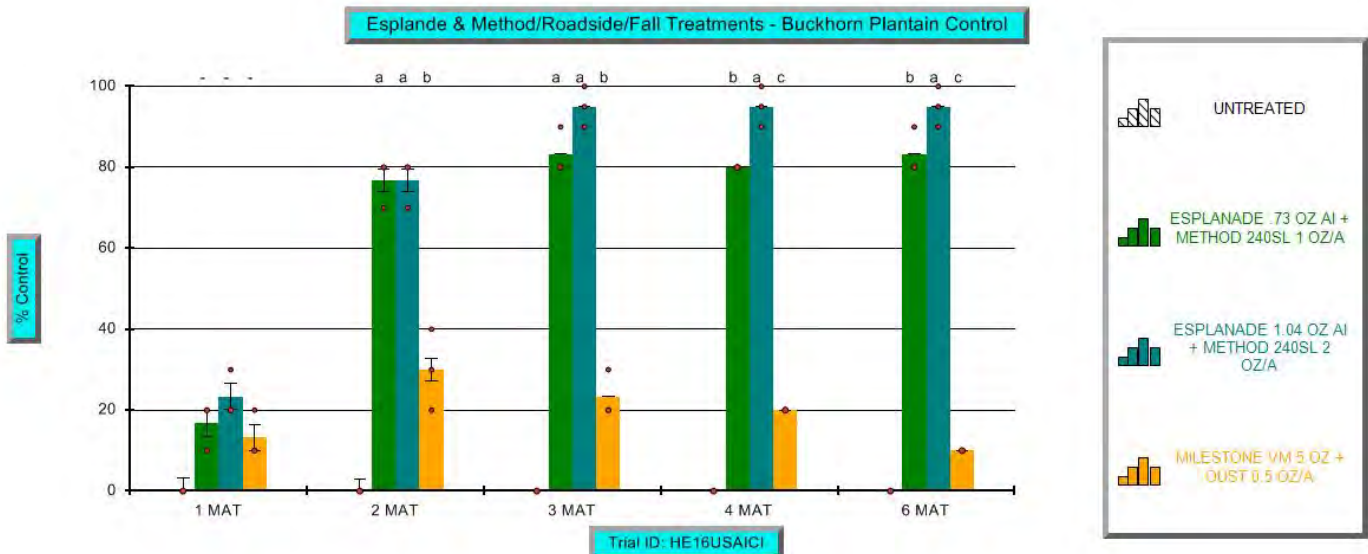


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Cynodon dactyl>	Paspalum notat>	Paspalum notat>	Hordeum pusill>	Setaria genicu>	Digitaria cili>		
Crop Scientific Name	Apr-21-2017	Apr-21-2017	Apr-21-2017	Apr-21-2017	Jun-26-2017	Jun-26-2017		
Rating Date	GROUND	GROUND	COLOR	GROUND	GROUND	GROUND		
Rating Type	percent	percent	1-9	percent	percent	percent		
Rating Unit	179 85	179 85	179 85	179 85	245 151	245 151		
Days After First/Last Applic.	179 DA-A	179 DA-A	179 DA-A	179 DA-A	245 DA-A	245 DA-A		
Trt-Eval Interval	L05	L05	L05	L05	L05	EC L05		
ARM Action Codes								
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	42*	43*	44*	45*	46*	47*
1UNTREATED			20.0b	8.3-	7.0a	10.0-	4.0b	1.7-
2ESPLANADE	0.73oz ai/a	A	46.7a	16.7-	6.0b	3.3-	23.3a	0.0-
METHOD 240SL	1oz ai/a	A						
NIS	0.25% v/v	A						
3ESPLANADE	1.04oz ai/a	A	45.0a	16.7-	6.0b	3.3-	18.3a	0.0-
METHOD 240SL	2oz ai/a	A						
NIS	0.25% v/v	A						
7MILESTONE VM	5oz/a	A	30.0ab	13.3-	6.3b	10.0-	5.0b	0.0-
OUST	0.5oz/a	A						
NIS	0.25% v/v	A						
LSD P=.05			17.54	10.13	0.58	11.65	9.25	2.88
Standard Deviation			8.78	5.07	0.29	5.83	4.63	1.44
CV			24.79	36.87	4.56	87.5	36.56	346.41
Bartlett's X2			0.467	3.575	0.0	2.712	3.031	0.0
P(Bartlett's X2)			0.926	0.311	.	0.438	0.22	.
Skewness			0.1234	0.9124	0.8124	0.8735	0.5768	3.4641*
Kurtosis			-0.9991	0.481	-1.65	-0.3495	-1.2882	12.0*
Replicate F			4.892	6.081	1.000	4.102	1.415	1.000
Replicate Prob(F)			0.0549	0.0361	0.4219	0.0754	0.3138	0.4219
Treatment F			6.297	1.811	8.000	1.306	13.047	1.000
Treatment Prob(F)			0.0277	0.2454	0.0161	0.3560	0.0049	0.4547

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 124. Buckhorn plantain (*Plantago lanceolata*) control through 6 MAT following herbicide applications on October 24, 2016.



Esplanade & Method for Winter Weed Control (Continued)

Chart 125. Hairy pod pea (*Lathyrus hirsutus*) control through 6 MAT following herbicide applications on October 24, 2016.

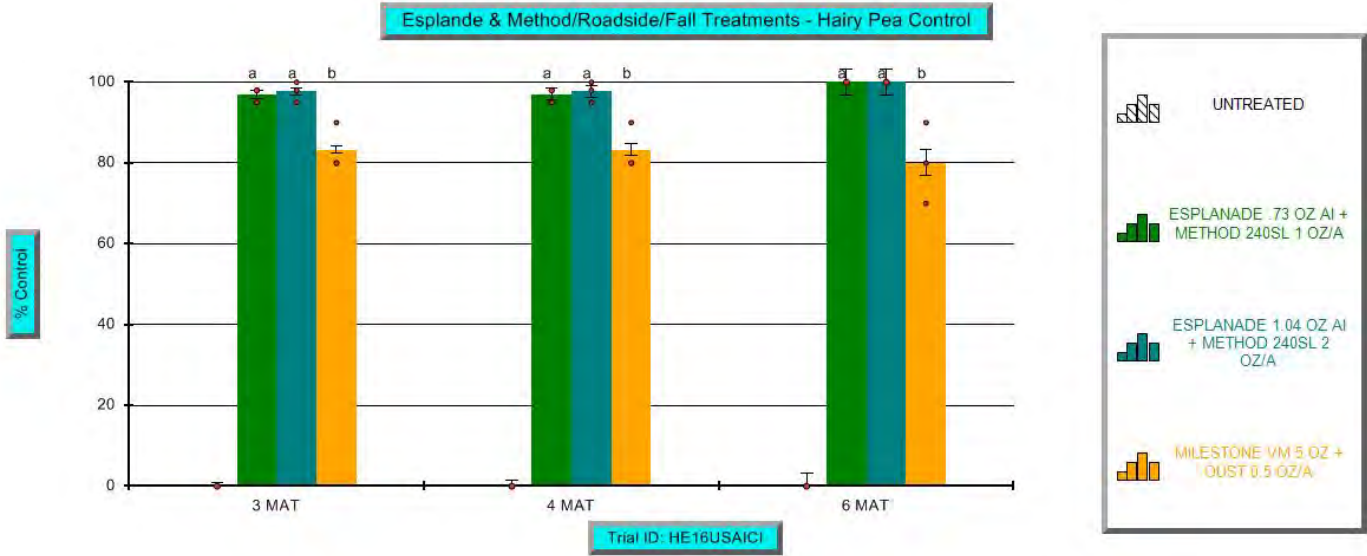
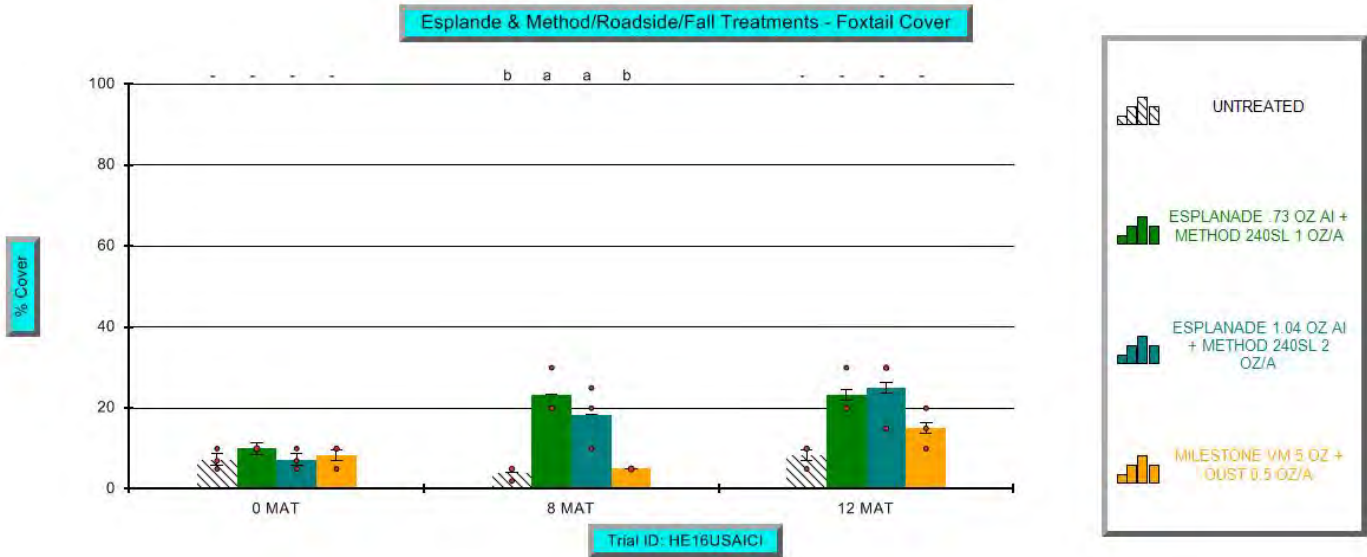


Chart 126. Knotroot foxtail (*Setaria parviflora*) cover through 12 MAT following herbicide applications on October 24, 2016.



Esplanade & Method for Winter Weed Control (Continued)

Chart 127. Southern crabgrass (*Digitaria ciliaris*) cover through 12 MAT following herbicide applications on October 24, 2016.

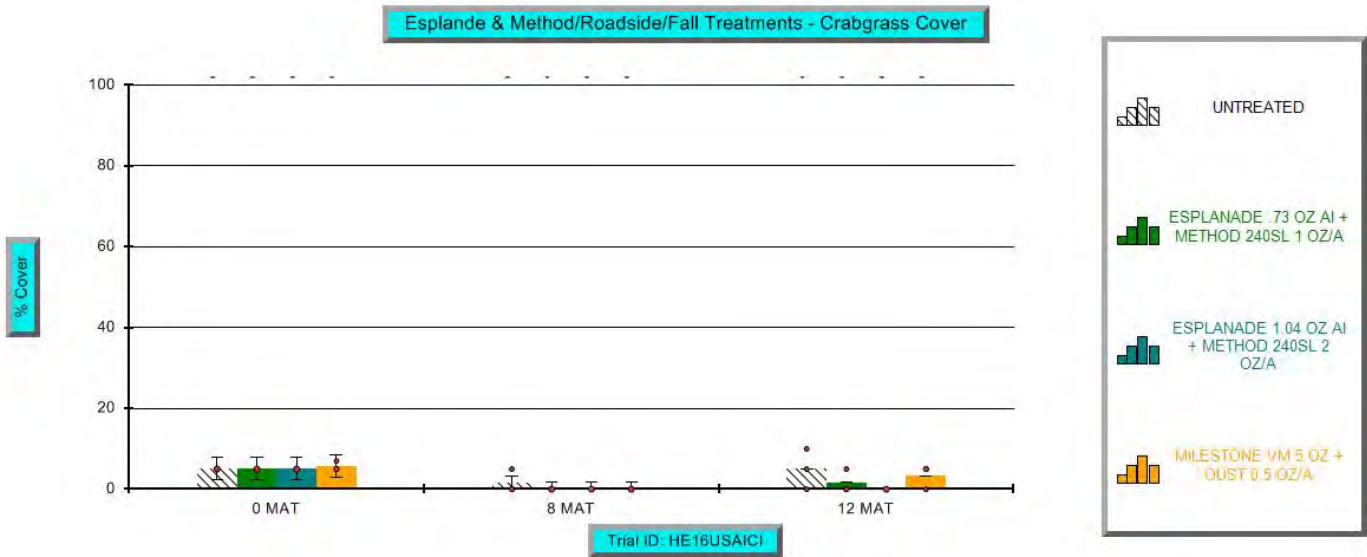
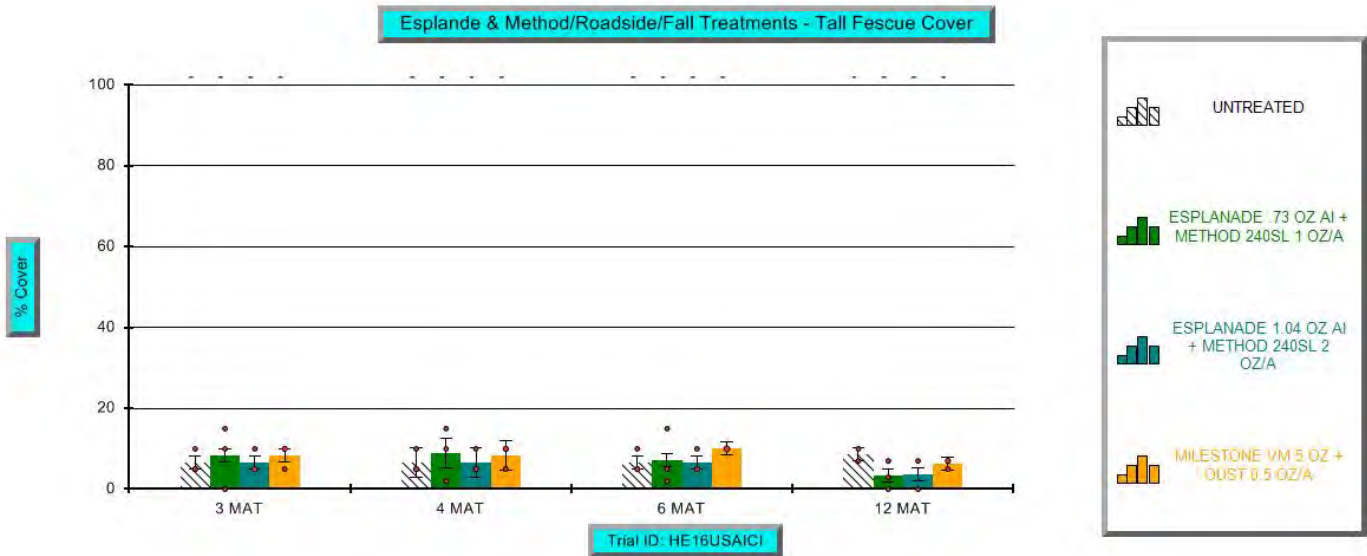
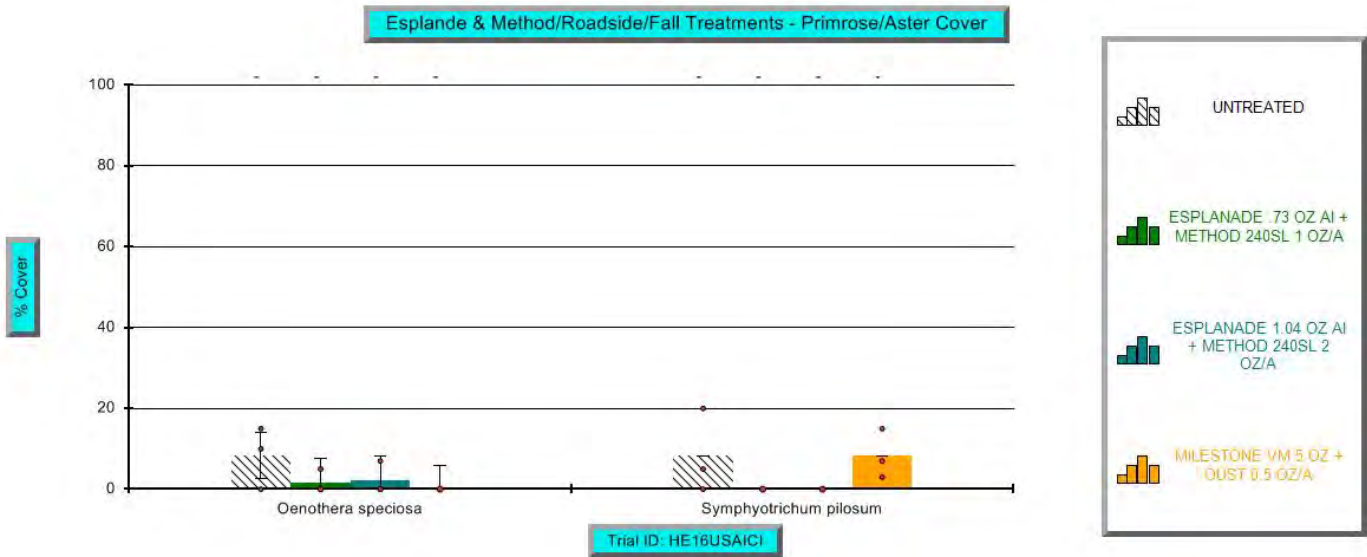


Chart 128. Tall fescue (*Schedonorus arundinaceus*) cover through 12 MAT following herbicide applications on October 24, 2016.



Esplanade & Method for Winter Weed Control (Continued)

Chart 129. Showy evening primrose (*Oenothera speciosa*) and white heath aster (*Symphyotrichum pilosum*) cover at 12 MAT following herbicide applications on October 24, 2016.



Esplanade & Method for Winter Weed Control – Application B		
Trial ID:HE16USAICI	Location: Artesia	Trial Year:2016
Protocol ID:HE16USAICI	Investigator:Belcher, Jason	
Project ID:LOCAL_PROJ	Study Director:Victor Maddox	
	Sponsor Contact:Belcher, Jason	

Trial Location									
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">City:Artesia</td> <td style="width: 33%;">Country:USA</td> <td style="width: 33%;">United States</td> </tr> <tr> <td colspan="3">State/Prov.:Mississippi</td> </tr> <tr> <td colspan="3" style="text-align: center;"> Latitude of LL Corner °:33.36209 N Longitude of LL Corner °:88.64124 W </td> </tr> </table>	City:Artesia	Country:USA	United States	State/Prov.:Mississippi			Latitude of LL Corner °:33.36209 N Longitude of LL Corner °:88.64124 W		
City:Artesia	Country:USA	United States							
State/Prov.:Mississippi									
Latitude of LL Corner °:33.36209 N Longitude of LL Corner °:88.64124 W									

Directions:

Across from old Holcomb cement plant on west side of Hwy 45 South of Artesia, MS. Lowndes County.

Conducted Under
GLP: No
Conducted Under
GEP: No

Objectives: Evaluate Esplanade & Method tank-mixes in MDOT vegetation management control of cool season grasses and broadleaves on highway roadsides. Target August / September applications prior to the emergence of winter annual broadleaves and grasses (e.g. PREEMERGENCE). Target September / October applications after the emergence of winter annual broadleaves and grasses. The following information follows **Application A** and covers **Application B**. An overall conclusion for both applications follows this section.

Results and Discussion:**Application B (second application)**

Green percent cover was around 70% at initiation (0 MAT) with the majority being annual ryegrass (*Lolium multiflorum*) (Chart 130), buckhorn plantain (*Plantago lanceolata*), and hairy pea (*Lathyrus hirsutus*). Differences among treatments were not significant at 0 MAT for any of these species, or percent green cover. However at 1 MAT, there was significantly less green cover on all herbicide treatments compared to the check. Esplanade and Method plus Derigo had significantly less cover compared to all treatments. This is reflected by it having significantly better control of the three major weeds, annual ryegrass, buckhorn plantain, and hairy pea, at this point in the study. A similar pattern was observed at four months, but differences were not significant at 5 and 6 MAT.

Turfgrass Response. Despite some differences in bahiagrass cover there was no significant differences at 2, 4, 5, and 6 MAT (Chart 131). Bermudagrass cover was similar with no significant differences between treatments at 2, 4, 5, and 6 MAT (Chart 132). However, significant bahiagrass discoloration was observed at 2 MAT during greenup (Chart 133). The standard treatment showed the greatest discoloration at 5, compared to 7 for the check. Unlike Application A, discoloration on bermudagrass was not observed in these treatments (Chart 134).

Changes in tall fescue cover were not significant in **Application A** treatments, but were in this application. At 2 MAT 2, combinations with Esplanade had more control (damage) of tall fescue, but all treatments damaged tall fescue (Chart 135).

Annual ryegrass control was significantly higher (80% each) in the Esplanade-Method-Derigo and standard treatment at 1 MAT (Chart 136). Smooth brome (*Bromus inermis*) showed the same pattern. By 2 MAT, both Esplanade treatments had the highest ryegrass control at 100% each. Oddly, the Esplanade-Method-Derigo treatment, had the best control of smooth brome on this date at only 83.3%, significantly better than any other treatment (Chart 137). Both had senesced by 4 MAT. However, cheatgrass (*Bromus tectorum*) was still evident. There was significantly more cheatgrass cover in the Derigo treatment compared to the other treatments. Esplanade-Method-Derigo had the lowest cover. It appears that the 3-way mix has more activity on *Bromus* species than the 2-way mix or Derigo alone. This study indicates that Derigo alone may release cheatgrass (average percent cover over 3x the check), a consideration where this species is prevalent.

Esplanade & Method for Winter Weed Control (Continued)

Results and Discussion (Continued):

Application B (second application) (Continued)

At about 77 and 100%, Esplanade-Method-Derigo showed the best buckhorn plantain control at 1 and 2 MAT (Chart 138). At 4 and 5 MAT, both treatments with Esplanade showed excellent control of buckhorn plantain with control at or near 100%.

At 1 MAT, Esplanade-Method-Derigo showed the best control of hairy pea (Chart 139). By 2 MAT, there were no significant differences between it (100%) and Esplanade plus Derigo (93.3%). Hairy pea had senesced by 4 MAT. However, both products, particularly the 3-way mix, showed excellent control of hairy pea in this study.

Only slight increases in knotroot foxtail cover were observed following **Application B** (Chart 140) and increases were not significant. It is not clear why the response to this later application differed from the first application, except possible increased residual from Esplanade. Southern crabgrass cover was low in all plots (Chart 141) following **Application B**, so no comments can be made.

As with the first application, overall cover was not significant during this application. This is positive for erosion concerns.

In conclusion, products with Esplanade seem to be superior to the standard treatment for most parameters in this study. Derigo used alone may release smooth brome and particularly downy brome (data not shown), under the conditions in this study. A combination may be better in areas where mixtures of *Bromus* spp. is prevalent. This needs further study.

Site and Design

Treated Plot
Width: 6 FT

Treated Plot
Length: 30 FT

Treated Plot
Area: 180 FT² Treatments 8
:

Replications: 3

Study: RACOB Randomized Complete Block
Design: L (RCB)

Application Description

	A	B
Application Date:	Oct-24-2016	Jan-26-2017
Appl. Start Time:	10:00 AM	10:30 AM
Interval to Prev. Appl., Unit:		94 DAYS
Application Method:	SPRAY	SPRAY
Application Timing:	POSPRE	POSPRE
Application Placement:	FOLIAR	FOLIAR
Applied By:	VMaddox	VMaddox
Air Temperature, Unit:	62 F	47 F
% Relative Humidity:	65	45
Wind Velocity, Unit:	3 MPH	5 MPH
Wind Direction:	NE	N
Dew Presence (Y/N):	N no	N no
Soil Moisture:	DRY	NORMAL
% Cloud Cover:	60	10

Esplanade & Method for Winter Weed Control (Continued)

Application Equipment

	A	B
Equipment Type:	BACCAI	BACCAI
Operation Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	FLAFAN	
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	4 FT	4 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	WATER	WATER
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 L	2 L
Tank Mix (Y/N):	Y yes	Y yes

Reps: 3 Appl Code: A Plots: 6 by 30 feet
 Spray vol: 25 GAL/AC

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate Unit	Appl Code	Spray Volume	Volume Unit	Amt Product to Measure	Rep 1	2	3
2	ESPLANADE	1.66666663	LBA/GAL	SC	0.73oz ai/a	A	25GAL/AC	25GAL/AC	2.19 mL/mx	102	204	305
	METHOD 240SL		2LBA/GAL	SL	1oz ai/a	A	25GAL/AC	25GAL/AC	2.5 mL/mx			
	NIS		100%AW/W	XL	0.25% v/v	A	25GAL/AC	25GAL/AC	4.999 mL/mx			
3	ESPLANADE	1.66666663	LBA/GAL	SC	1.04oz ai/a	A	25GAL/AC	25GAL/AC	3.12 mL/mx	103	205	308
	METHOD 240SL		2LBA/GAL	SL	2oz ai/a	A	25GAL/AC	25GAL/AC	4.999 mL/mx			
	NIS		100%AW/W	XL	0.25% v/v	A	25GAL/AC	25GAL/AC	4.999 mL/mx			
7	MILESTONE VM		2LBA/GAL	XL	5oz/a	A	25GAL/AC	25GAL/AC	3.125 mL/mx	107	203	301
	OUST		75%AW/W	WG	0.5oz/a	A	25GAL/AC	25GAL/AC	0.2996 g/mx			
	NIS		100%AW/W	XL	0.25% v/v	A	25GAL/AC	25GAL/AC	4.999 mL/mx			

Reps: 3 Appl Code: B Plots: 6 by 30 feet
 Spray vol: 25 GAL/AC

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate Unit	Appl Code	Spray Volume	Volume Unit	Amt Product to Measure	Rep 1	2	3
4	DERIGO	36.4%	AW/W	WG	1.09oz ai/a	B	25GAL/AC	25GAL/AC	1.794 g/mx	104	202	303
	NIS	100%	AW/W	XL	0.25% v/v	B	25GAL/AC	25GAL/AC	4.999 mL/mx			
5	ESPLANADE	1.66666663	LBA/GAL	SC	0.73oz ai/a	B	25GAL/AC	25GAL/AC	2.19 mL/mx	105	206	304
	DERIGO	36.4%	AW/W	WG	1.09oz ai/a	B	25GAL/AC	25GAL/AC	1.794 g/mx			
	NIS	100%	AW/W	XL	0.25% v/v	B	25GAL/AC	25GAL/AC	4.999 mL/mx			
6	ESPLANADE	1.66666663	LBA/GAL	SC	0.73oz ai/a	B	25GAL/AC	25GAL/AC	2.19 mL/mx	106	208	302
	METHOD 240SL		2LBA/GAL	SL	1oz ai/a	B	25GAL/AC	25GAL/AC	2.5 mL/mx			
	DERIGO	36.4%	AW/W	WG	1.09oz ai/a	B	25GAL/AC	25GAL/AC	1.794 g/mx			
	NIS	100%	AW/W	XL	0.25% v/v	B	25GAL/AC	25GAL/AC	4.999 mL/mx			
8	ACCORD XRT II	5.07	LBA/GAL	XL	0.375qt/a	B	25GAL/AC	25GAL/AC	7.5 mL/mx	108	201	307
	OUST	75%	AW/W	WG	0.5oz wt/a	B	25GAL/AC	25GAL/AC	0.2996 g/mx			
	NIS	100%	AW/W	XL	0.25% v/v	B	25GAL/AC	25GAL/AC	4.999 mL/mx			

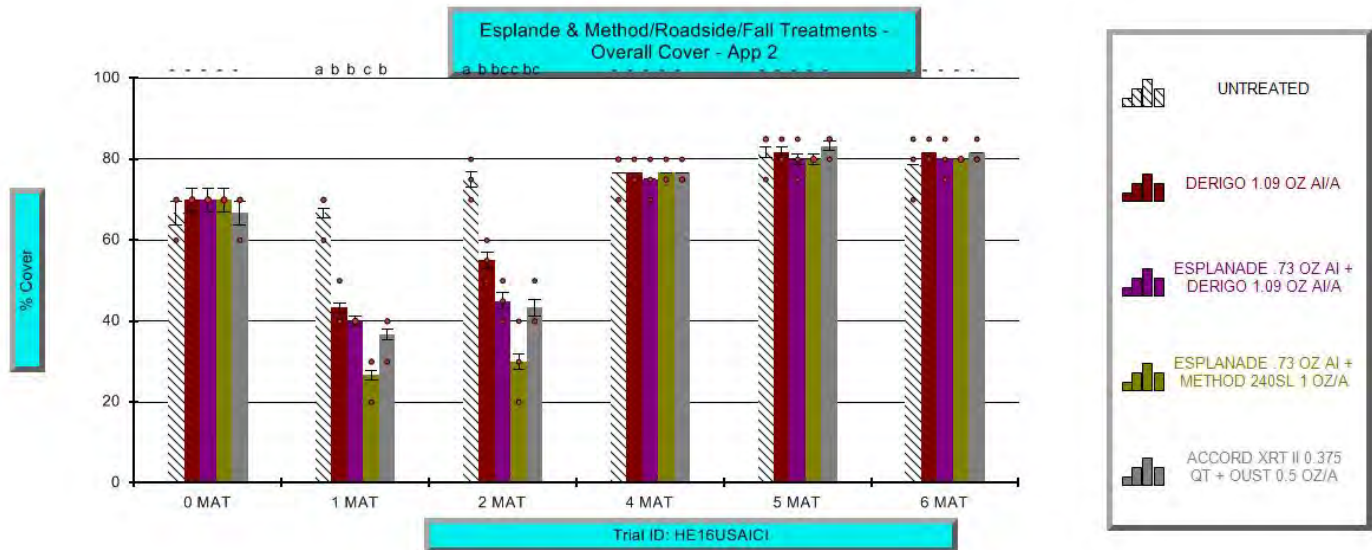
Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate Unit	Appl Code	Spray Volume	Volume Unit	Amt Product to Measure	Rep 1	2	3
1	UNTREATED									101	207	306

Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Overall Cover	Overall Green	Plantago lance>	Lolium multifl>	Schedonorus ar>	Lathyrus hirsu>		
Crop Scientific Name								
Rating Date	Jan-26-2017	Jan-26-2017	Jan-26-2017	Jan-26-2017	Jan-26-2017	Jan-26-2017		
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND	GROUND		
Rating Unit	percent	percent	percent	percent	percent	percent		
Days After First/Last Applic.	94 94	94 94	94 94	94 94	94 94	94 94		
Trt-Eval Interval	0 DA-B	0 DA-B	0 DA-B	0 DA-B	0 DA-B	0 DA-B		
ARM Action Codes	EC L05	L05	L05	L05	L05	L05		
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	48*	49*	50*	51*	52*	53*
1UNTREATED			78.3-	66.7-	18.3-	26.7-	6.7-	18.3-
4DERIGO	1.09oz ai/a	B	80.0-	70.0-	15.0-	36.7-	6.7-	16.7-
NIS	0.25% v/v	B						
5ESPLANADE	0.73oz ai/a	B	80.0-	70.0-	16.7-	36.7-	6.7-	18.3-
DERIGO	1.09oz ai/a	B						
NIS	0.25% v/v	B						
6ESPLANADE	0.73oz ai/a	B	80.0-	70.0-	18.3-	33.3-	8.3-	20.0-
METHOD 240SL	1oz ai/a	B						
DERIGO	1.09oz ai/a	B						
NIS	0.25% v/v	B						
8ACCORD XRT II	0.375qt/a	B	80.0-	66.7-	16.7-	31.7-	6.7-	13.3-
OUST	0.5oz wt/a	B						
NIS	0.25% v/v	B						
LSD P=.05			2.43	7.29	5.01	9.49	5.70	11.78
Standard Deviation			1.29	3.87	2.66	5.04	3.03	6.26
CV			1.62	5.64	15.66	15.28	43.25	36.11
Bartlett's X2			0.0	0.0	2.988	2.524	0.0	1.209
P(Bartlett's X2)			.	.	0.56	0.64	.	0.877
Skewness			-3.873*	-2.4048*	-0.0697	-1.07	0.4551	0.4502
Kurtosis			15.0*	4.3491*	-0.2244	1.5935	-2.094	-1.249
Replicate F			1.000	0.444	11.294	14.361	0.545	21.106
Replicate Prob(F)			0.4096	0.6561	0.0047	0.0023	0.5997	0.0006
Treatment F			1.000	0.667	0.824	2.033	0.182	0.489
Treatment Prob(F)			0.4609	0.6328	0.5454	0.1825	0.9414	0.7443

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 130. Overall cover through 6 MAT following herbicide applications on January 26, 2017.

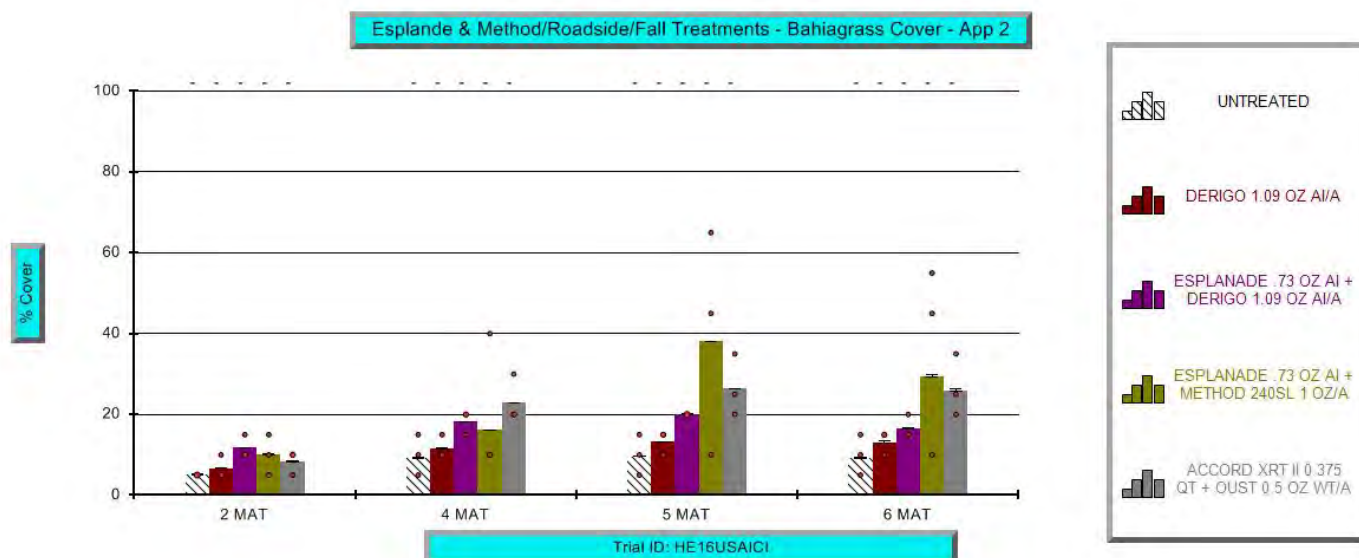


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Overall Cover	Overall Green	Plantago lance>	Lolium multifi>	Schedonorus ar>	Lathyrus hirsu>			
Crop Scientific Name									
Rating Date	Feb-24-2017	Feb-24-2017	Feb-24-2017	Feb-24-2017	Feb-24-2017	Feb-24-2017			
Rating Type	GROUND	GROUND	CONTRO	CONTRO	CONTRO	CONTRO			
Rating Unit	percent	percent	percent	percent	percent	percent			
Days After First/Last Applic.	123 29	123 29	123 29	123 29	123 29	123 29			
Trt-Eval Interval	29 DA-B	29 DA-B	29 DA-B	29 DA-B	29 DA-B	29 DA-B			
ARM Action Codes	EC L05	L05	EC L05E	EC L05E	ET5 EC L05E	EC L05E			
Trt Treatment	Rate	Appl							
No. Name	Rate	Unit	Code	54*	55*	56*	57*	58*	59*
1UNTREATED				78.3-	66.7a	0.0	0.0	0.0	0.0
4DERIGO	1.09oz ai/a	B		80.0-	43.3b	23.3c	50.0b	30.0-	30.0d
NIS	0.25% v/v	B							
5ESPLANADE	0.73oz ai/a	B		80.0-	40.0b	36.7b	53.3b	30.0-	63.3b
DERIGO	1.09oz ai/a	B							
NIS	0.25% v/v	B							
6ESPLANADE	0.73oz ai/a	B		80.0-	26.7c	76.7a	80.0a	30.0-	90.0a
METHOD 240SL	1oz ai/a	B							
DERIGO	1.09oz ai/a	B							
NIS	0.25% v/v	B							
8ACCORD XRT II	0.375qt/a	B		80.0-	36.7b	30.0bc	80.0a	33.3-	46.7c
OUST	0.5oz wt/a	B							
NIS	0.25% v/v	B							
LSD P=.05				2.43	9.72	7.45	5.77	5.77	11.04
Standard Deviation				1.29	5.16	3.73	2.89	2.89	5.53
CV				1.62	12.1	8.94	4.38	9.36	9.61
Bartlett's X2				0.0	0.0	0.0	0.0	0.0	0.824
P(Bartlett's X2)					1.00				0.662
Skewness				-3.873*	0.7925	1.0843	-0.0956	3.4641*	0.1188
Kurtosis				15.0*	0.2214	-0.3947	-2.3225	12.0*	-1.1686
Replicate F				1.000	1.000	4.200	1.000	1.000	5.727
Replicate Prob(F)				0.4096	0.4096	0.0723	0.4219	0.4219	0.0406
Treatment F				1.000	24.625	124.000	97.000	1.000	64.273
Treatment Prob(F)				0.4609	0.0001	0.0001	0.0001	0.4547	0.0001

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 131. Bahiagrass (*Paspalum notatum*) cover through 6 MAT following herbicide applications on January 26, 2017.

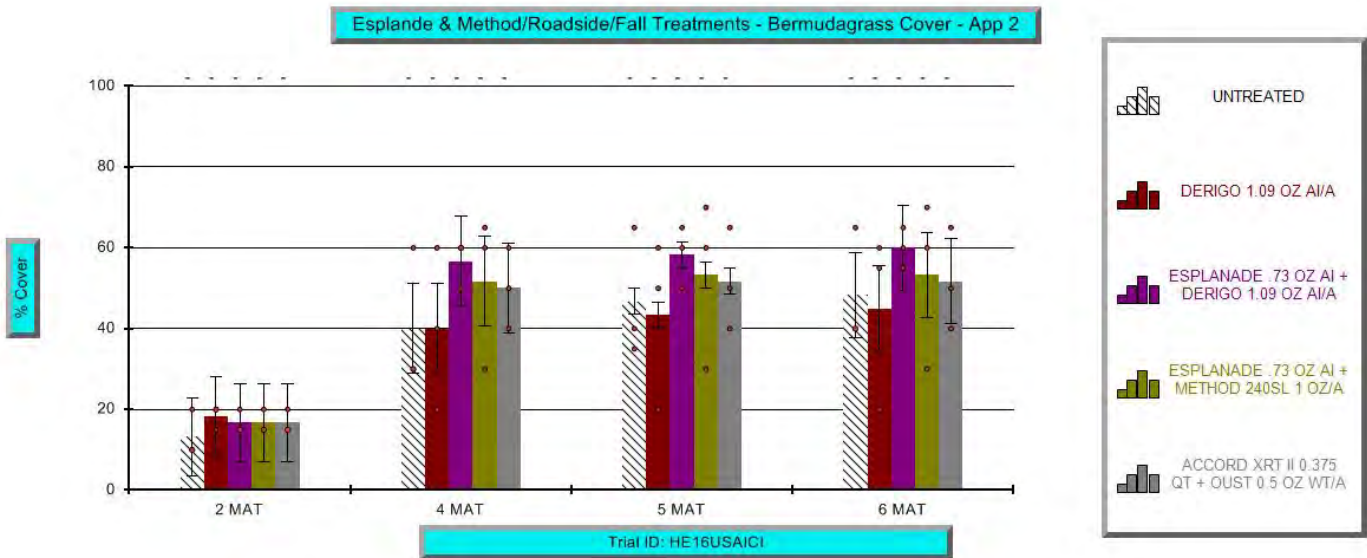


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Bromus inermis	Cynodon dactyl>	Overall Cover	Overall Green	Plantago lance>	Lolium multifi>		
Crop Scientific Name								
Rating Date	Feb-24-2017	Feb-24-2017	Mar-27-2017	Mar-27-2017	Mar-27-2017	Mar-27-2017		
Rating Type	CONTRO	COLOR	GROUND	GROUND	CONTRO	CONTRO		
Rating Unit	percent	1-9	percent	percent	percent	percent		
Days After First/Last Applic.	123 29	123 29	154 60	154 60	154 60	154 60		
Trt-Eval Interval	29 DA-B	29 DA-B	60 DA-B	60 DA-B	60 DA-B	60 DA-B		
ARM Action Codes	EC L05E	L05	EC L05	L05	EC L05E	EC L05E		
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	60*	61*	62*	63*		
64*	65*							
1UNTREATED			0.0	7.0-	78.3-	75.0a	0.0	
4DERIGO	1.09oz ai/a B		46.7b	7.0-	80.0-	55.0b	20.0d	
NIS	0.25% v/v B						83.3c	
5ESPLANADE	0.73oz ai/a B		53.3b	7.0-	80.0-	45.0b	83.3b	
DERIGO	1.09oz ai/a B						100.0a	
NIS	0.25% v/v B							
6ESPLANADE	0.73oz ai/a B		76.7a	7.0-	80.0-	30.0c	100.0a	
METHOD 240SL	1oz ai/a B						100.0a	
DERIGO	1.09oz ai/a B							
NIS	0.25% v/v B							
8ACCORD XRT II	0.375qt/a B		80.0a	7.0-	80.0-	43.3b	50.0c	
OUST	0.5oz wt/a B						93.3b	
NIS	0.25% v/v B							
LSD P=.05			11.04		2.43	12.69	5.77	6.00
Standard Deviation			5.53	0.00	1.29	6.74	2.89	3.00
CV			8.61	0.0	1.62	13.57	4.56	3.19
Bartlett's X2			0.0	0.0	0.0	1.518	0.0	0.84
P(Bartlett's X2)						0.824		0.359
Skewness			-0.1571		-3.873*	0.3054	-0.2435	-1.1359
Kurtosis			-1.8809		15.0*	-0.1368	-1.6036	0.0468
Replicate F			0.273	0.000	1.000	0.587	1.000	1.615
Replicate Prob(F)			0.7703	1.0000	0.4096	0.5782	0.4219	0.2746
Treatment F			27.182	0.000	1.000	18.477	456.000	20.615
Treatment Prob(F)			0.0007	1.0000	0.4609	0.0004	0.0001	0.0015

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 132. Bermudagrass (*Cynodon dactylon*) cover through 6 MAT following herbicide applications on January 26, 2017.

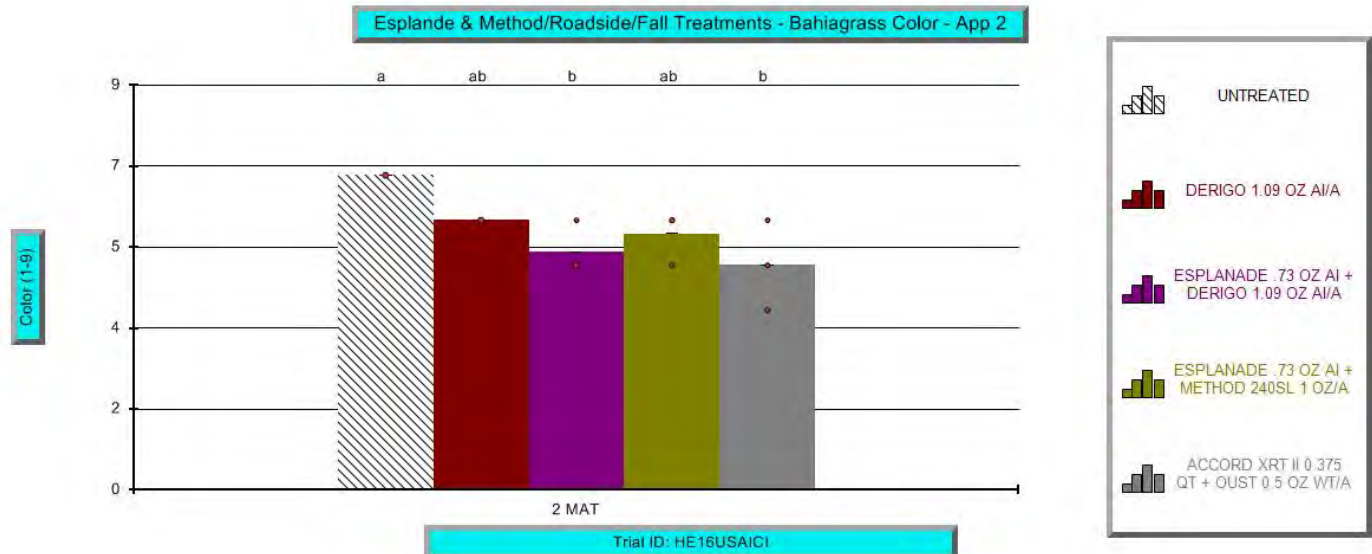


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Schedonorus ar>	Lathyrus hirsu>	Bromus inermis	Cynodon dactyl>	Cynodon dactyl>		
Crop Scientific Name							
Rating Date	Mar-27-2017	Mar-27-2017	Mar-27-2017	Mar-27-2017	Mar-27-2017		
Rating Type	CONTRO	CONTRO	CONTRO	COLOR	GROUND		
Rating Unit	percent	percent	percent	1-9	percent		
Days After First/Last Applic.	154 60	154 60	154 60	154 60	154 60		
Trt-Eval Interval	60 DA-B	60 DA-B	60 DA-B	60 DA-B	60 DA-B		
ARM Action Codes	EC L05E	EC L05E	EC L05E	L05	L05		
Trt Treatment	Rate	Appl					
No. Name	Rate	Unit Code	66*	67*	68*	69*	70*
1UNTREATED			0.0	0.0	0.0	7.0-	13.3-
4DERIGO	1.09oz ai/a	B	40.0b	26.7b	0.0c	7.0-	18.3-
NIS	0.25% v/v	B					
5ESPLANADE	0.73oz ai/a	B	66.7a	93.3a	36.7b	7.0-	16.7-
DERIGO	1.09oz ai/a	B					
NIS	0.25% v/v	B					
6ESPLANADE	0.73oz ai/a	B	50.0ab	100.0a	83.3a	7.0-	16.7-
METHOD 240SL	1oz ai/a	B					
DERIGO	1.09oz ai/a	B					
NIS	0.25% v/v	B					
8ACCORD XRT II	0.375qt/a	B	36.7b	40.0b	53.3b	7.0-	16.7-
OUST	0.5oz wt/a	B					
NIS	0.25% v/v	B					
LSD P=.05			18.54	25.58	25.08	.	5.57
Standard Deviation			9.28	12.80	12.56	0.00	2.96
CV			19.2	19.7	28.97	0.0	18.11
Bartlett's X2			0.824	0.421	6.95	0.0	1.662
P(Bartlett's X2)			0.662	0.81	0.031*	.	0.798
Skewness			0.8243	-0.1675	-0.2458	.	-0.433
Kurtosis			1.1778	-2.0302	-1.4277	.	-0.6691
Replicate F			0.097	0.458	0.648	0.000	3.619
Replicate Prob(F)			0.9091	0.6532	0.5564	1.0000	0.0760
Treatment F			6.323	25.153	22.978	0.000	1.143
Treatment Prob(F)			0.0275	0.0008	0.0011	1.0000	0.4025

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 133. Bahiagrass (*Paspalum notatum*) color at 2 MAT following herbicide applications on January 26, 2017.

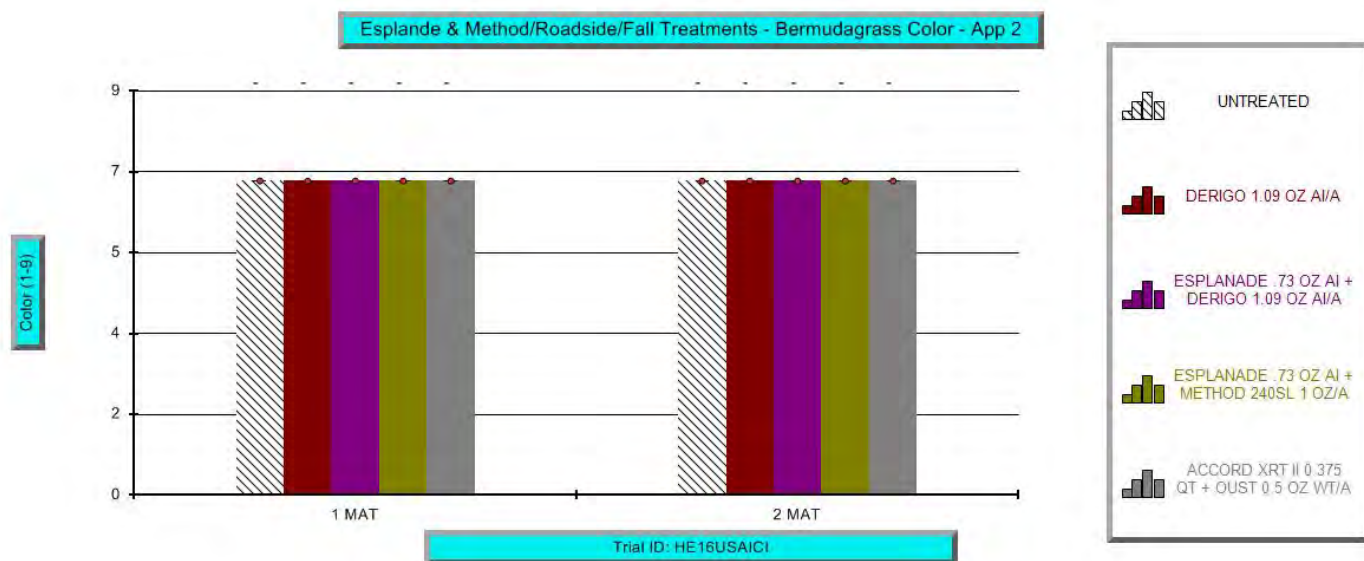


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Paspalum notat>		Paspalum notat>		Overall Green	Plantago lance>	Cynodon dactyl>	
Crop Scientific Name	Mar-27-2017		Mar-27-2017		May-26-2017	May-26-2017	May-26-2017	
Rating Date	COLOR		GROUND		GROUND	CONTRO	GROUND	
Rating Type	1-9		percent		percent	percent	percent	
Rating Unit	154 60		154 60		214 120	214 120	214 120	
Days After First/Last Applic.	60 DA-B		60 DA-B		120 DA-B	120 DA-B	120 DA-B	
Trt-Eval Interval	L05		L05		L05	AA EC L05E	L05	
ARM Action Codes	L05		L05		L05	AA EC L05E	L05	
Trt Treatment	Rate	Appl						
No. Name	Rate	Unit	Code	71*	72*	73*	74*	75*
1UNTREATED				7.0a	5.0-	76.7-	0.0	40.0-
4DERIGO	1.09oz ai/a	B		6.0ab	6.7-	76.7-	53.9b	40.0-
NIS	0.25% v/v	B						
5ESPLANADE	0.73oz ai/a	B		5.3b	11.7-	75.0-	99.8a	56.7-
DERIGO	1.09oz ai/a	B						
NIS	0.25% v/v	B						
6ESPLANADE	0.73oz ai/a	B		5.7b	10.0-	76.7-	100.0a	51.7-
METHOD 240SL	1oz ai/a	B						
DERIGO	1.09oz ai/a	B						
NIS	0.25% v/v	B						
8ACCORD XRT II	0.375qt/a	B		5.0b	8.3-	76.7-	73.8b	50.0-
OUST	0.5oz wt/a	B						
NIS	0.25% v/v	B						
LSD P=.05				1.14	6.20	7.97	7.97 - 26.38	29.62
Standard Deviation				0.61	3.29	4.23	8.21t	15.73
CV				10.44	39.5	5.55	11.57t	33.0
Bartlett's X2				0.797	0.93	1.691	2.469	2.896
P(Bartlett's X2)				0.671	0.818	0.792	0.291	0.575
Skewness				-0.3398	0.628	-0.433	-0.567	-0.5691
Kurtosis				-0.1115	-0.6542	-0.6691	-1.0465	-1.1781
Replicate F				0.545	0.615	0.651	1.568	0.815
Replicate Prob(F)				0.5997	0.5642	0.5470	0.2833	0.4763
Treatment F				4.818	1.923	0.093	19.768	0.667
Treatment Prob(F)				0.0283	0.2000	0.9819	0.0016	0.6328

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 134. Bermudagrass (*Cynodon dactylon*) color through 2 MAT following herbicide applications on January 26, 2017.

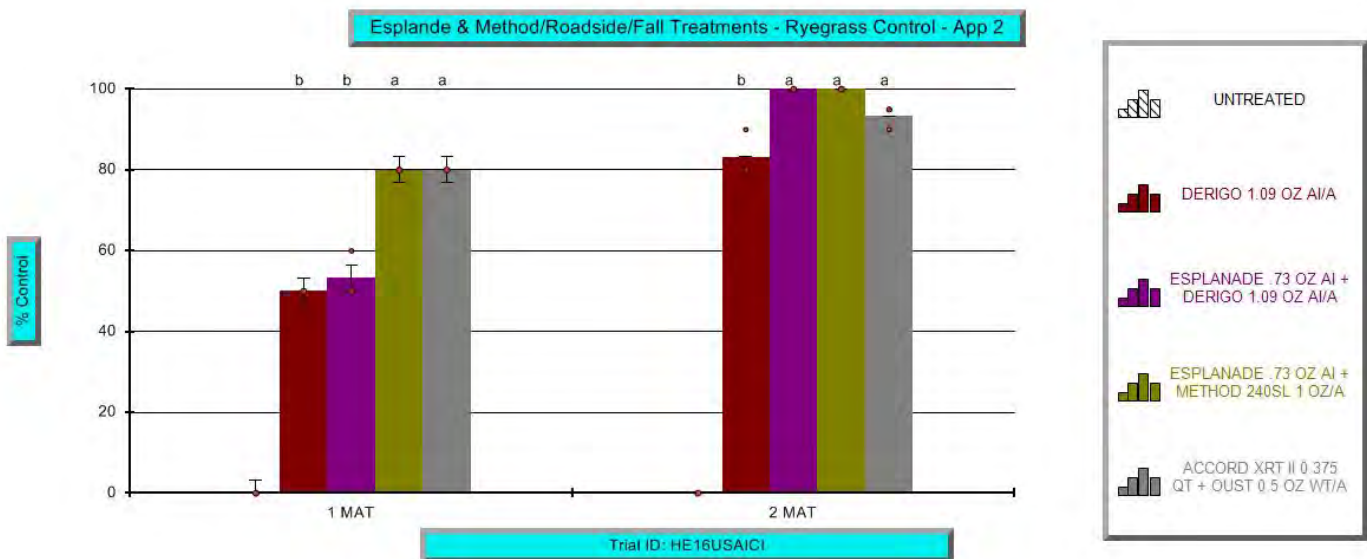


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name		bromus tectorum	Overall Green	Plantago lance>	Cynodon dactyl>		
Crop Scientific Name	Paspalum notat>						
Rating Date	May-26-2017	May-26-2017	Jun-26-2017	Jun-26-2017	Jun-26-2017		
Rating Type	GROUND	GROUND	GROUND	CONTRO	GROUND		
Rating Unit	percent	percent	percent	percent	percent		
Days After First/Last Applic.	214 120	214 120	245 151	245 151	245 151		
Trt-Eval Interval	120 DA-B	120 DA-B	151 DA-B	151 DA-B	151 DA-B		
ARM Action Codes	AL L05	L05	L05	AA EC L05E	L05		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	76*	77*	78*	79*	80*
1UNTREATED			9.2-	12.3bc	81.7-	0.0	46.7-
4DERIGO	1.09oz ai/a	B	11.5-	38.3a	81.7-	53.9b	43.3-
NIS	0.25% v/v	B					
5ESPLANADE	0.73oz ai/a	B	18.2-	10.7bc	80.0-	99.8a	58.3-
DERIGO	1.09oz ai/a	B					
NIS	0.25% v/v	B					
6ESPLANADE	0.73oz ai/a	B	16.1-	5.0c	80.0-	100.0a	53.3-
METHOD 240SL	1oz ai/a	B					
DERIGO	1.09oz ai/a	B					
NIS	0.25% v/v	B					
8ACCORD XRT II	0.375qt/a	B	22.9-	20.0b	83.3-	73.8b	51.7-
OUST	0.5oz wt/a	B					
NIS	0.25% v/v	B					
LSD P=.05			14.27 - 15.07	10.36	6.88	7.97 - 26.38	29.92
Standard Deviation			0.21t	5.50	3.65	8.21t	15.89
CV			17.46t	31.87	4.49	11.57t	31.36
Bartlett's X2			5.811	3.544	1.349	2.469	1.953
P(Bartlett's X2)			0.214	0.471	0.718	0.291	0.744
Skewness			0.0756	0.9588	-0.433	-0.567	-0.6384
Kurtosis			0.2796	0.5399	-0.6691	-1.0465	-0.5232
Replicate F			0.059	7.227	1.625	1.568	1.314
Replicate Prob(F)			0.9434	0.0161	0.2557	0.2833	0.3211
Treatment F			1.497	16.584	0.438	19.768	0.406
Treatment Prob(F)			0.2901	0.0006	0.7787	0.0016	0.7998

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 136. Annual ryegrass (*Lolium multiflorum*) control through 2 MAT following herbicide applications on January 26, 2017.

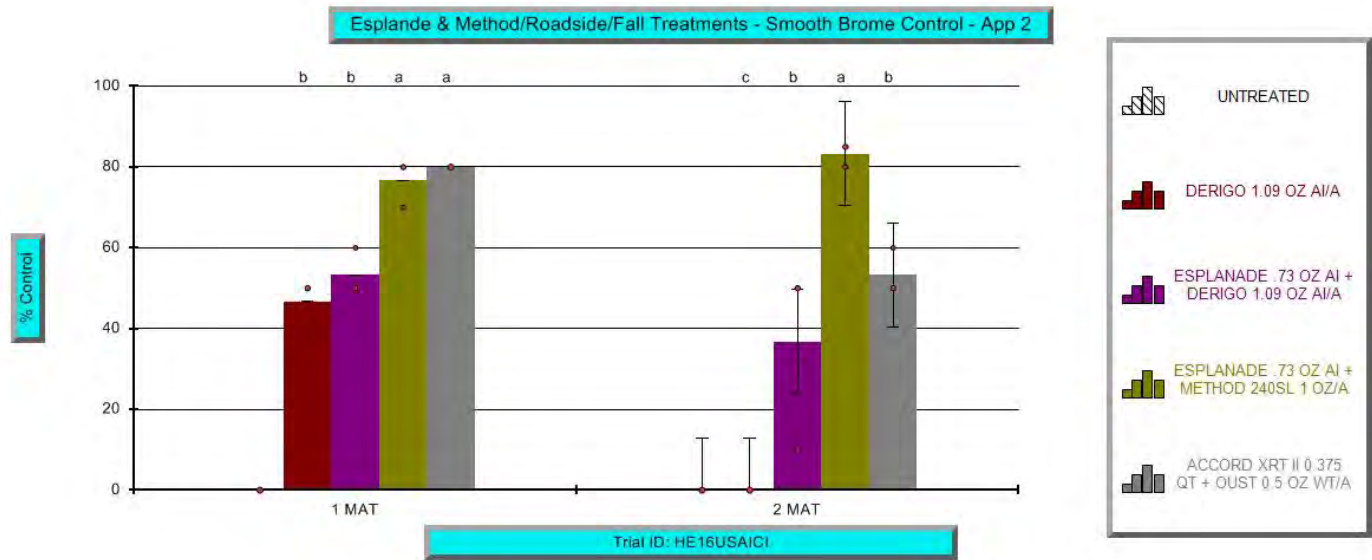


Esplanade & Method for Winter Weed Control (Continued)

Pest Scientific Name	Paspalum notat>	Setaria genicu>	Digitaria cili>	Overall Green	Cynodon dactyl>			
Crop Scientific Name								
Rating Date	Jun-26-2017	Jun-26-2017	Jun-26-2017	Jul-25-2017	Jul-25-2017			
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND			
Rating Unit	percent	percent	percent	percent	percent			
Days After First/Last Applic.	245 151	245 151	245 151	274 180	274 180			
Trt-Eval Interval	151 DA-B	151 DA-B	151 DA-B	180 DA-B	180 DA-B			
ARM Action Codes	AA L05	L05	AA L05	AA L05	L05			
Trt Treatment	Rate	Appl						
No. Name	Rate	Unit	Code					
1UNTREATED				81*	82*	83*	84*	85*
4DERIGO	1.09oz ai/a	B		9.6-	4.0-	0.6-	78.6-	48.3-
NIS	0.25% v/v	B		13.2-	11.7-	0.6-	81.7-	45.0-
5ESPLANADE	0.73oz ai/a	B		20.0-	15.0-	0.0-	80.2-	60.0-
DERIGO	1.09oz ai/a	B						
NIS	0.25% v/v	B						
6ESPLANADE	0.73oz ai/a	B		38.1-	13.3-	0.0-	80.0-	53.3-
METHOD 240SL	1oz ai/a	B						
DERIGO	1.09oz ai/a	B						
NIS	0.25% v/v	B						
8ACCORD XRT II	0.375qt/a	B		26.4-	15.0-	0.2-	81.7-	51.7-
OUST	0.5oz wt/a	B						
NIS	0.25% v/v	B						
LSD P=.05	22.19 - 24.25	11.22	2.66 - 99999.57	6.84 - 7.38	30.19			
Standard Deviation	8.64t	5.96	3.75t	2.72t	16.03			
CV	32.01t	50.5	165.79t	4.27t	31.03			
Bartlett's X2	7.458	2.958	0.463	1.992	3.355			
P(Bartlett's X2)	0.059	0.565	0.793	0.574	0.50			
Skewness	1.3596*	0.1228	1.8457*	-0.8482	-0.8375			
Kurtosis	2.1466	-1.2627	1.8622	1.6816	-0.1295			
Replicate F	1.069	0.073	5.457	2.798	1.057			
Replicate Prob(F)	0.3878	0.9300	0.0320	0.1199	0.3915			
Treatment F	2.522	1.767	1.000	0.358	0.373			
Treatment Prob(F)	0.1236	0.2285	0.4609	0.8320	0.8220			

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 137. Smooth brome grass (*Bromus inemis*) control through 2 MAT following herbicide applications on January 26, 2017.

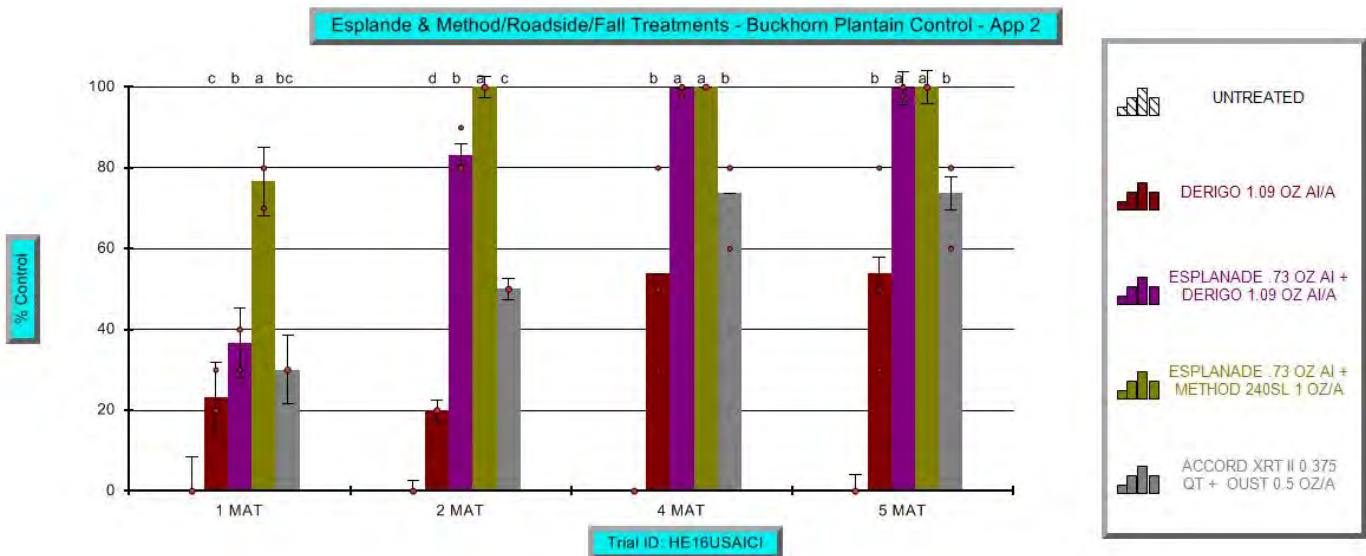


Esplanade & Method for Winter Weed Control (Continued)

Trt	Treatment	Rate	Appl				
No.	Name	Rate	Unit	Code	86*	87*	88*
1	UNTREATED				9.2-	4.0-	0.6-
4	DERIGO	1.09oz ai/a	B		13.1-	11.7-	0.6-
	NIS	0.25% v/v	B				
5	ESPLANADE	0.73oz ai/a	B		16.5-	15.0-	0.0-
	DERIGO	1.09oz ai/a	B				
	NIS	0.25% v/v	B				
6	ESPLANADE	0.73oz ai/a	B		29.5-	13.3-	0.0-
	METHOD 240SL	1oz ai/a	B				
	DERIGO	1.09oz ai/a	B				
	NIS	0.25% v/v	B				
8	ACCORD XRT II	0.375qt/a	B		26.0-	15.0-	0.2-
	OUST	0.5oz wt/a	B				
	NIS	0.25% v/v	B				
LSD P=.05					15.62 - 18.46	11.22	2.66 - 99999.57
Standard Deviation					0.21t	5.96	3.75t
CV					16.98t	50.5	165.79t
Bartlett's X2					6.54	2.958	0.463
P(Bartlett's X2)					0.162	0.565	0.793
Skewness					0.2918	0.1228	1.8457*
Kurtosis					0.1591	-1.2627	1.8622
Replicate F					0.835	0.073	5.457
Replicate Prob(F)					0.4686	0.9300	0.0320
Treatment F					2.534	1.767	1.000
Treatment Prob(F)					0.1225	0.2285	0.4609

Means followed by same letter or symbol do not differ significantly (P=.05, LSD).

Chart 138. Buckhorn plantain (*Plantago lanceolata*) control through 5 MAT following herbicide applications on January 26, 2017.



Esplanade & Method for Winter Weed Control (Continued)

Chart 139. Hairy pod pea (*Lathyrus hirsutus*) control through 2 MAT following herbicide applications on January 26, 2017.

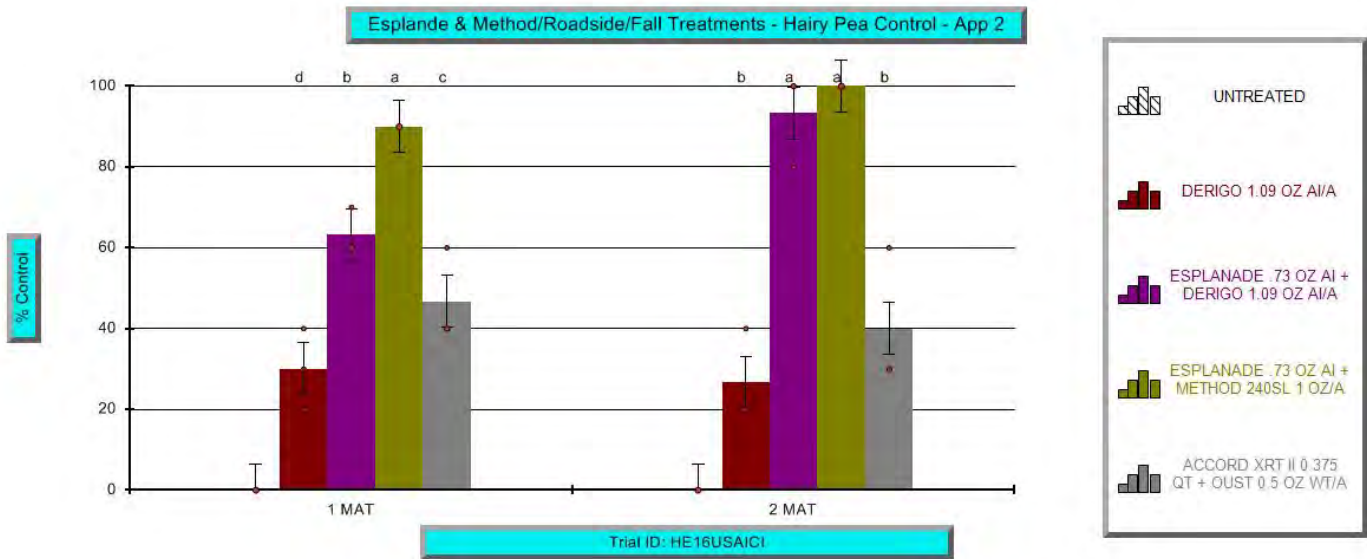
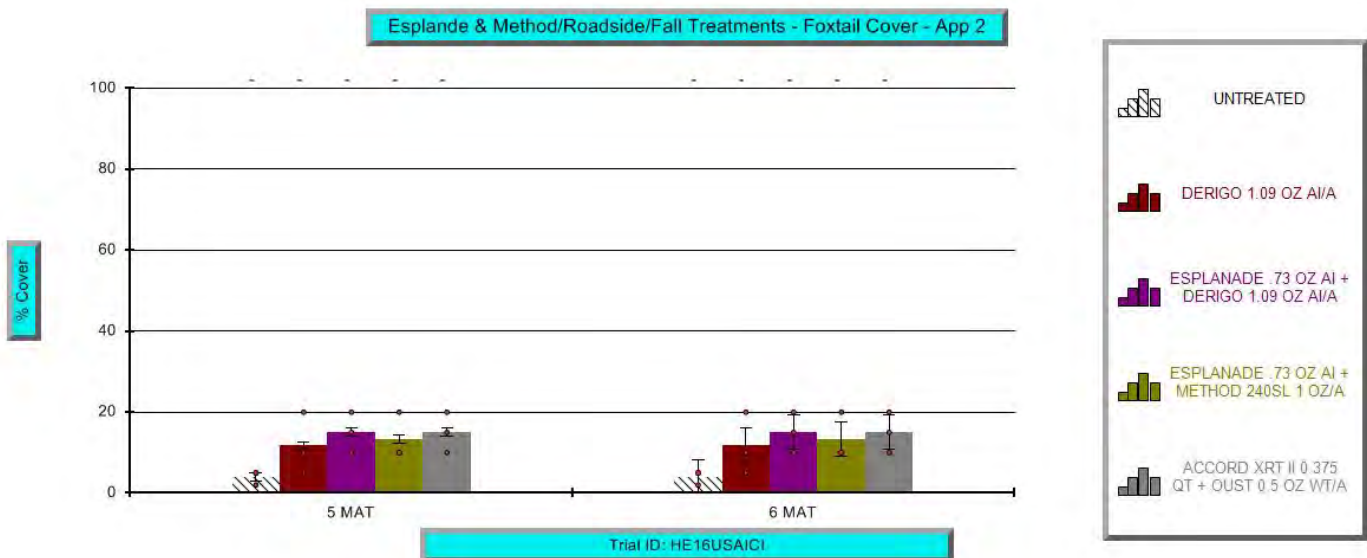
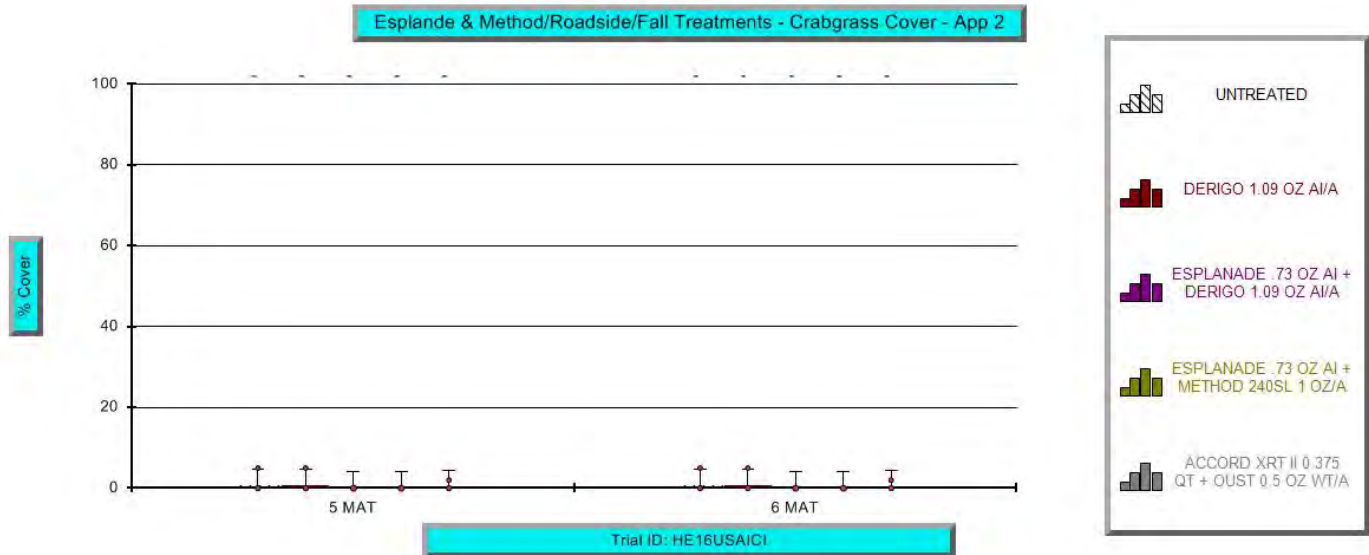


Chart 140. Knotroot foxtail (*Setaria parviflora*) cover through 6 MAT following herbicide applications on January 26, 2017.



Esplanade & Method for Winter Weed Control (Continued)

Chart 141. Southern crabgrass (*Digitaria ciliaris*) cover through 6 MAT following herbicide applications on January 26, 2017.



OVERALL CONCLUSIONS

Esplanade performed well in both application studies. These treatments were particularly effective on annual ryegrass, buckhorn plantain, and hairy pea. Application timing seems to influence discoloration on bermudagrass and tall fescue. It should be noted that the first application was applied near the end of a severe drought in late 2016. This may have influenced activity on winter annuals in this study. This meant that the first application went out before germination of winter annuals, unlike typical fall herbicide applications. Derigo in combination with Esplanade likely assisted POE ryegrass control in the second application. However, brome seemed more difficult to control POE. Broadleaf weeds in the study were effectively controlled following either application, so timing didn't seem as important. Treatments with Derigo, Esplanade, and/or Method were quite clean during the studies. This is important from an aesthetics standpoint on roadsides. It is also important considering that the bromes, ryegrass, buckhorn plantain, and hairy pea in this study are all invasive species in Mississippi.

**PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF
Application A**

General Trial Information

Trial ID: VUSA2016PIPERPR04.02
 Protocol ID: VUSA2016PIPERPR04.02
 Project ID:

2016-17 Trial Year:
 Investigator: Victor Maddox
 Sponsor Contact: Frank Carey

Trial Location

Address: Hwy 25 South
City: Louisville **Country:** USA United States
State/Prov.: Mississippi

Latitude of LL Corner °:33.08578 N
Longitude of LL Corner °:89.09899 W

Directions:

West side of Hwy 25 south of Louisville MS.

No.	Guideline	Description
1.	ADM-C-PU B	Confidentiality - Public Trial - No Secrecy Agreement Required

Objectives:

Evaluate Piper for winter annual weed control in unimproved roadside turf when applied at two different growth stages. Primary objective is Italian (annual) ryegrass (*Lolium multiflorum*) control with turf tolerance a major consideration.

Results and Discussion:

This study includes two applications, **Application A** (297-315) and **Application B** (316-334). The following discussion covers the first application, **Application A**. Refer to **Application B** for **Overall Conclusions**. This study was conducted in unimproved bahiagrass (*Paspalum notatum*) and bermudagrass (*Cynodon dactylon*) turf with heavy annual ryegrass pressure.

Overall Cover. At 0 WAT, overall green cover ranged from 30 to 36.3% on average (Chart 142). Significant reductions in cover were observed at 32 DAT compared to the untreated plots. Since bahiagrass and bermudagrass were dormant at the time of applications, this reduction was primarily due to weed control, and illustrates a positive reduction in cover. This reduction in cover was not as significant in plots treated with Accord alone.

Turf Response to Treatments. Based upon dormant cover, bahiagrass cover was 16.3 to 18.8% cover on average at the time of application on December 1, 2016 (0 MAT). During greenup at 120 DAT (4 MAT), bahiagrass discoloration was observed, but was only significant in the standard treatment (Oust + Milestone + Accord) plots (Chart 143). A similar pattern was observed at 151 DAT (5 MAT), but treatments receiving higher rates of Piper and/or Oust had similar discoloration. Bahiagrass discoloration was not observed at 182 DAT (6 MAT). Despite significant discoloration at 32 DAT, bahiagrass cover was highest in the standard treatment (Oust + Milestone + Accord) (32.5% on average) (Chart 144). This pattern was similar at 151 and 182 DAT, but plots receiving Accord alone had the highest bahiagrass cover at 182 DAT (35% on average). Bahiagrass cover was higher in herbicide treated plots compared to untreated plots throughout the study, indicating bahiagrass release.

Based upon dormant cover, bermudagrass cover was 13.8 to 22.5% on average at the time of application on December 1, 2016 (0 MAT). No discoloration on bermudagrass was observed during the study, based upon ratings taken 120 and 151 DAT (Chart 145). Bermudagrass cover was similar across all treatments at 120, 151, and 182 DAT, although there was a slight elevation in cover in plots treated with Piper alone at either rate (Chart 146). This may indicate some bermudagrass release by Piper treatments, but differences were not significant.

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Results and Discussion (Continued):

Turf Response to Treatments (Continued). Tall fescue (*Schedonorus arundinaceus*) damage (control) was observed at 32 DAT (1 MAT) in plots treated with Accord (Chart 147). By 62 DAT (2 MAT), damage was highest (85%) in the standard treatment but not significantly higher than Piper plus Oust (75%) or Accord alone (70%). This pattern was similar at 90 DAT (3 MAT), but damage was as significant plots treated with Piper plus Oust or Accord alone. This pattern was similar at 120 and 151 DAT (4 and 5 MAT). This indicates that standard treatments used on roadsides with Accord and/or Oust at the rates used in this study can be detrimental tall fescue cover. This may be an issue where tall fescue is desired. However, flowering height of tall fescue can be an issue on roadsides and some control close to the paved surface could be desirable.

Annual Ryegrass Control. At 32 DAT (1 MAT), ryegrass control was observed in all treatments, except Accord alone, but treatments with Piper were significantly better than the standard treatment (Oust + Milestone + Accord) (Chart 148). At 62 DAT (2 MAT) this pattern was similar and by 90 DAT (3 MAT), all treatments with Piper had significantly higher control compared to other herbicide treatments and range from 96.3 to 100 percent control on average. This pattern remained through 151 DAT (5 MAT). It should be noted that fall was very dry and ryegrass was not up on December 1, 2016. This may explain the poor response from Accord alone, since it is not a pre-emergent herbicide and lacks residual control.

Buckhorn Plantain (*Plantago lanceolata*) Control. At 32 DAT (1 MAT), treatments containing Oust were significantly better any other herbicide treatments, but average control was only 57.5% (Chart 149). By 62 DAT (2 MAT), treatments containing Accord showed significantly more control. At 90 (3 MAT), Accord alone showed significantly higher buckhorn plantain control at 91.3% than all other treatments, followed by the standard treatment at 77.5% control. A similar pattern was observed at 120 and 151 DAT. This indicates that Accord was likely most responsible for buckhorn plantain in this study. Since buckhorn plantain is a perennial, it was present at the time of application with around 10% cover on December 1, despite the dry conditions effecting annual weed germination.

Broadleaf Winter Annual Weed Responses. Accord alone had no activity on Carolina geranium (*Geranium carolinianum*) (Chart 150) since plants were not up at the time of applications. At 32 DAT, all other herbicide treatments showed good control ranging from 97.5 to 100%. A similar pattern was observed at 62 DAT. By 90 DAT all treatments with Piper showed significant control, with significantly less control in the standard treatment (88.8%). A similar pattern was observed at 120 and 151 DAT.

Control of common vetch (*Vicia sativa*) was highest (100%) in plots treated with the standard treatment at 32 DAT (Chart 151). By 62 DAT, the higher rate of Piper was had the highest control (100%). However, all herbicide treatments, except Accord alone, had over 90 percent control at 32 and 62 DAT.

Crimson clover (*Trifolium incarnatum*) (Chart 152) and little hop clover (*Trifolium dubium*) (Chart 153) were up at the time of application and Accord had some activity on each species. At 32 DAT, Accord alone showed about 50% control of crimson clover. However, all other herbicide treatments showed significantly more control ranging from 90 to 100%. This pattern was similar at 62 DAT for both species and remained at 90 and 120 DAT.

Wild Chervil (*Chaerophyllum tainturieri*) (Chart 154) was not up at the time of application and Accord had 0 activity on this species. All other herbicide treatments had activity ranging from 83.8 to 96.3% control at 90 DAT, 78.8 to 96.3% 120 DAT, and 63.8 to 91.3% 151 DAT. Piper plus Oust remained on the high end of control with the standard treatment on the low end at each rating date.

Daisy fleabane (*Erigeron strigosus*), smooth bedstraw (*Galium mollugo*), and bracted plantain (*Plantago aristata*) (Chart 155) cover showed interesting responses to herbicide treatments at 182 DAT. Daisy fleabane seemed to have been released with Piper treatments at either rate. Other herbicide treatments seemed to have some activity which may imply it was up at the time the applications were applied based on response to the Accord treatment. However, Piper showed some control of smooth bedstraw based upon cover. Cover in the standard treatment was 23.8% on average which seems to indicate a release since the cover in the check was only 8.8%. Piper may also have some activity on bracted plantain based upon cover. However, these data only represents one date in time and more research is needed on these species for conclusive results.

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)
Results and Discussion (Continued):

Warm-season Annual Grasses. Southern crabgrass (*Digitaria ciliaris*) (Chart 156) and knotroot foxtail (*Setaria parviflora*) (Chart 157) seemed to have been released in this study based upon cover at 151 and 182 DAT. At both dates for both species cover in the untreated plots was less than herbicide treated plots. This was most pronounced in plots treated with Piper or Piper plus Oust, or the standard treatment. It is likely that residual from these treatments was not present at the time of spring germination for these grasses and fewer competing weeds in the plots released both species. This could be a consideration when applying these products under the conditions of this study.

Conclusions: See **Overall Conclusions** following **Results and Discussion** of **Application B** of this study.

Site and Design

Treated Plot
Width: 12 FT

Treated Plot
Length: 35 FT

Treated Plot
Area: 420 FT² Treatments 12

Replications: 4

Study Design: RACOBL Randomized Complete Block (RCB)

Application Description

	A	B
Application Date:	Dec-1-2016	Jan-27-2017
Appl. Start Time:	11:00 AM	2:00 PM
Interval to Prev. Appl., Unit:		57 DAYS
Application Method:	SPRAY	SPRAY
Application Timing:	POSPRE	POSPRE
Application Placement:	FOLIAR	FOLIAR
Applied By:	VMaddox	VMaddox
Air Temperature, Unit:	56 F	46 F
% Relative Humidity:	55	40
Wind Velocity, Unit:	5 MPH	9 MPH
Wind Direction:	N	W
Dew Presence (Y/N):	N no	N no
Soil Moisture:	NORMAL	NORMAL
% Cloud Cover:	0	80

Application Equipment

	A	B
Appl. Equipment:	BASB	BASB
Equipment Type:	backpa	BACCAI
Operation Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	FLAFAN	FLAFAN
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	WATER	WATER
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 L	2 L
Tank Mix (Y/N):	Y yes	Y yes

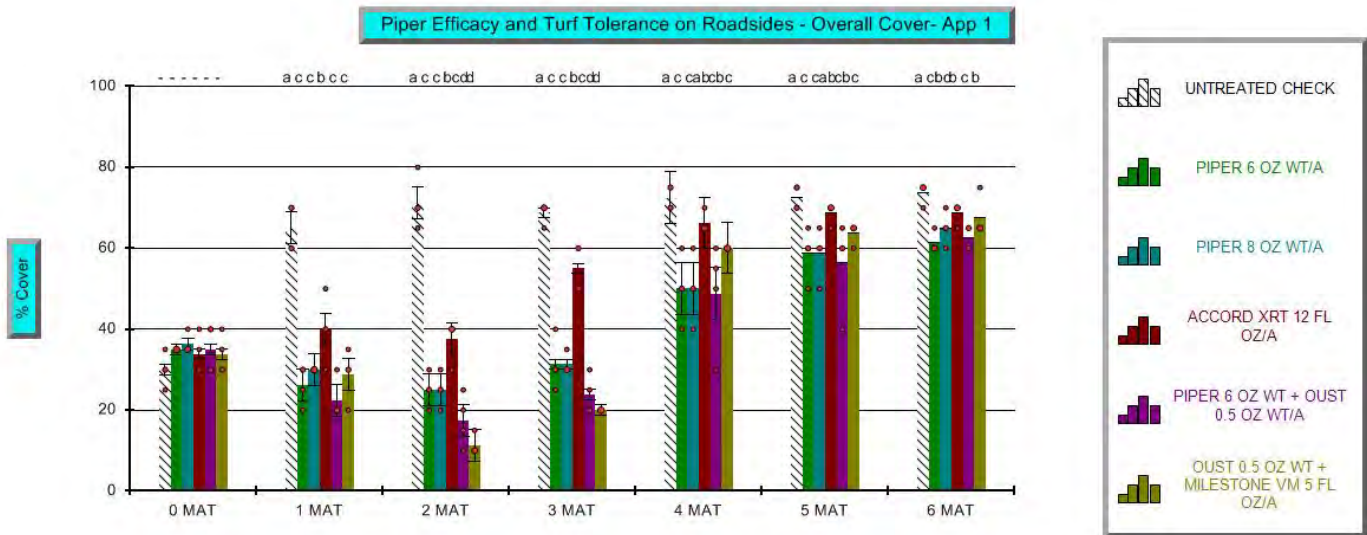
PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Reps: 4 Appl Code: A Plots: 12 by 35 feet
 Spray vol: 25 GAL/AC

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Re-Entry Interval	Rate Rate	Growth Unit	Appl Stage	Spray Code	Volume Volume	Dilution Unit	Amt Product to Measure	Rep 1	Rep 2	Rep 3	Rep 4
1	UNTREATED CHECK	0NA	NA	NA	UNTREATED CHECK								101	212	305	412

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Re-Entry Interval	Rate Rate	Growth Unit	Appl Stage	Spray Code	Volume Volume	Dilution Unit	Amt Product to Measure	Rep 1	Rep 2	Rep 3	Rep 4
2	PIPER	76%W/W	WG	FLUMIOXZN+PYROXSLFN	6oz wt/a	FOSP	A	25GAL/AC	3.595 g/mx	102	204	312	406			
	COC	100%W/W	OC	PETROLEUM OIL CONC	1% v/v	FOSP	A	25GAL/AC	20.0 mL/mx							
3	PIPER	76%W/W	WG	FLUMIOXZN+PYROXSLFN	8oz wt/a	FOSP	A	25GAL/AC	4.793 g/mx	103	205	308	404			
	COC	100%W/W	OC	PETROLEUM OIL CONC	1% v/v	FOSP	A	25GAL/AC	20.0 mL/mx							
4	ACCORD XRT	5.07LBAI/GAL	SL	GLYPHOSATE-IPA(SALT)	12fl oz/a	FOSP	A	25GAL/AC	7.5 mL/mx	104	211	307	410			
5	PIPER	76%W/W	WG	FLUMIOXZN+PYROXSLFN	6oz wt/a	FOSP	A	25GAL/AC	3.595 g/mx	105	206	311	407			
	OUST	75%W/W	WG	SULFOMETURON-METHY L	0.5oz wt/a	FOSP	A	25GAL/AC	0.2996 g/mx							
	COC	100%W/W	OC	PETROLEUM OIL CONC	1% v/v	FOSP	A	25GAL/AC	20.0 mL/mx							
6	OUST	75%W/W	WG	SULFOMETURON-METHY L	0.5oz wt/a	FOSP	A	25GAL/AC	0.2996 g/mx	106	207	303	408			
	MILESTONE VM	2LBAI/GAL	EC	AMINOPYRALID	5fl oz/a	FOSP	A	25GAL/AC	3.125 mL/mx							
	ACCORD XRT	5.07LBAI/GAL	SL	GLYPHOSATE-IPA(SALT)	12fl oz/a	FOSP	A	25GAL/AC	7.5 mL/mx							

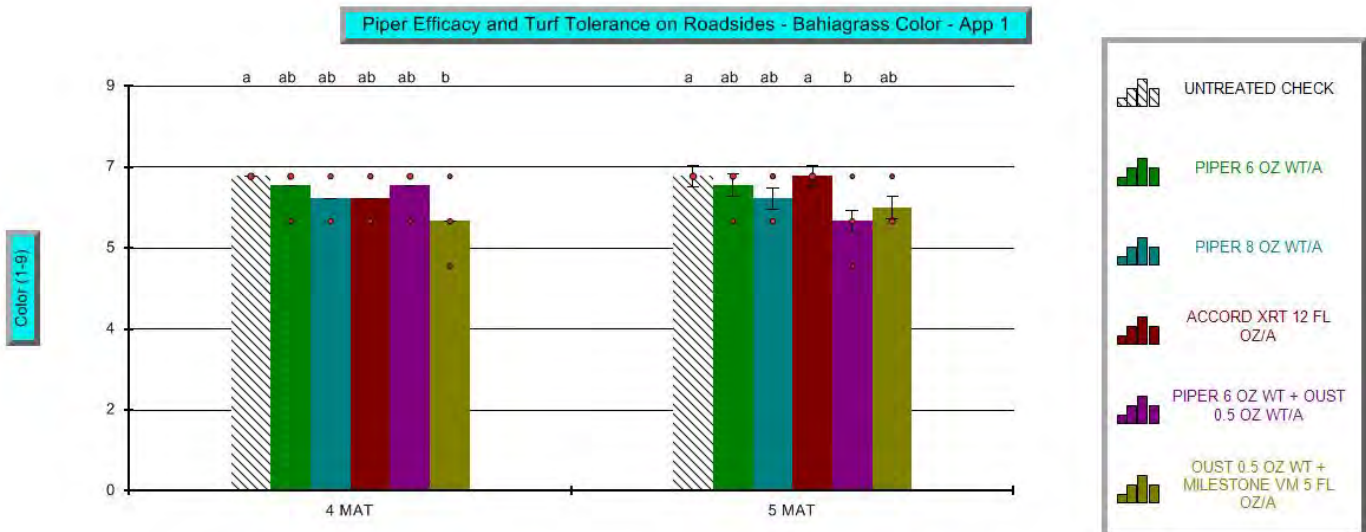
Chart 142. Overall cover through 6 months after herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type			W Weed	W Weed	W Weed
Pest Code			PLALA	DIGAD	FESAR
Pest Scientific Name			Plantago lance>	Digitaria cili>	Schedonorus ar>
Pest Name			Buckhorn plant>	Henry crabgrass	Tall fescue
Crop Code	CYNDA	PASNO			
BBCH Scale	BGRM	BGRM			
Crop Scientific Name	Cynodon dactyl>	Paspalum notat>			
Crop Name	Common bermuda>	Water couch			
Part Rated	PLANT C	PLANT C			PLANT P
Rating Date	Dec-1-2016	Dec-1-2016	Dec-1-2016	Dec-1-2016	Dec-1-2016
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	0 0	0 0	0 0	0 0	0 0
Trt-Eval Interval	0 DA-A	0 DA-A	0 DA-A	0 DA-A	0 DA-A
ARM Action Codes	L05	L05	L05	L05	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	1*	2*	3*
1UNTREATED CHECK			22.5-	17.5-	9.5-
2PIPER	6oz wt/a A		22.5-	16.3-	9.5-
COC	1% v/v A				22.5-
3PIPER	8oz wt/a A		15.0-	17.5-	10.8-
COC	1% v/v A				21.3-
4ACCORD XRT	12fl oz/a A		15.0-	18.8-	9.5-
5PIPER	6oz wt/a A		15.0-	16.3-	10.8-
OUST	0.5oz wt/a A				20.0-
COC	1% v/v A				12.5-
6OUST	0.5oz wt/a A		13.8-	16.3-	9.0-
MILESTONE VM	5fl oz/a A				20.0-
ACCORD XRT	12fl oz/a A				10.8-
LSD P=.05	10.23	5.21	2.59	4.61	7.03
Standard Deviation	6.79	3.46	1.72	3.06	4.67
CV	39.24	20.23	17.45	14.55	45.16
Levene's F	1.112	0.567	0.635	0.909	0.604
Levene's Prob(F)	0.389	0.724	0.676	0.497	0.698
Skewness	2.482*	-0.0681	1.7908*	1.9368*	0.6705
Kurtosis	6.7451*	0.2151	4.0783*	3.4753*	0.6617
Replicate F	7.443	20.814	2.528	4.556	2.776
Replicate Prob(F)	0.0028	0.0001	0.0966	0.0185	0.0775
Treatment F	1.434	0.349	0.736	0.644	0.857
Treatment Prob(F)	0.2685	0.8751	0.6080	0.6698	0.5315

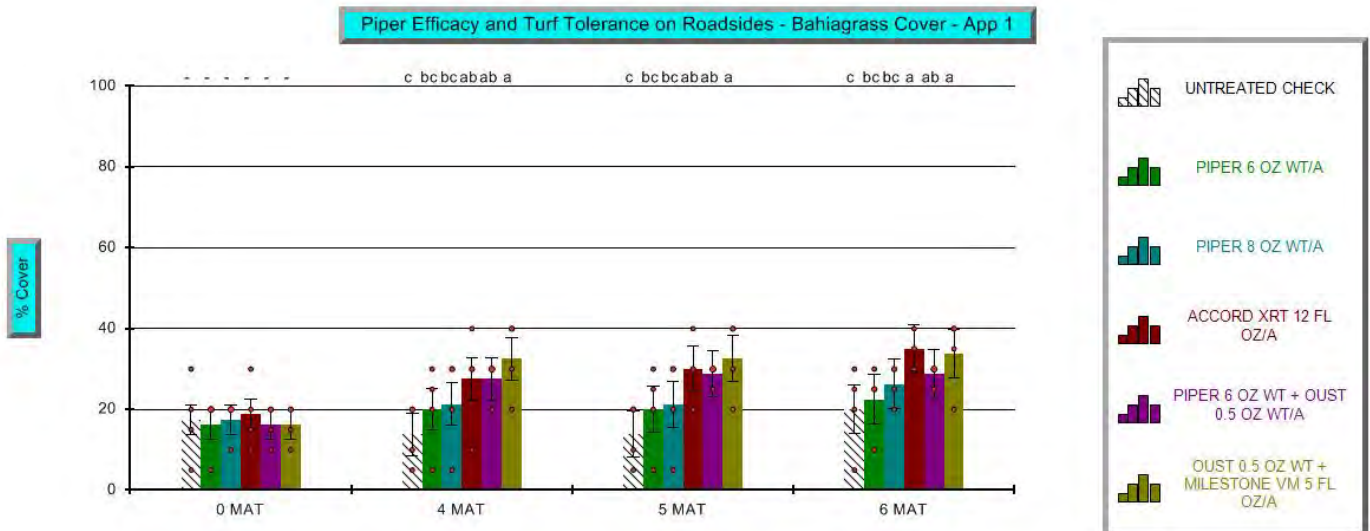
Chart 143. Bahiagrass (*Paspalum notatum*) color (1-9) at 4 and 5 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type			W Weed	W Weed	W Weed
Pest Code			LOLMU	PLALA	FESAR
Pest Scientific Name	Green Overall	Green Overall	Lolium multifl>	Plantago lance>	Schedonorus ar>
Pest Name			Bearded ryegra>	Buckhorn plant>	Tall fescue
Part Rated			PLANT P		PLANT P
Rating Date	Dec-1-2016	Jan-2-2017	Jan-2-2017	Jan-2-2017	Jan-2-2017
Rating Type	GROUND	GROUND	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	0 0	32 32	32 32	32 32	32 32
Trt-Eval Interval	0 DA-A	32 DA-A	32 DA-A	32 DA-A	32 DA-A
ARM Action Codes	L05	L05	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	6*	14*	15*
1UNTREATED CHECK			30.0-	65.0a	0.0
2PIPER	6oz wt/a	A	35.0-	26.3c	95.0ab
COC	1% v/v	A			30.0d
3PIPER	8oz wt/a	A	36.3-	30.0c	91.3b
COC	1% v/v	A			50.0b
4ACCORD XRT	12fl oz/a	A	33.8-	40.0b	0.0d
5PIPER	6oz wt/a	A	35.0-	22.5c	100.0a
OUST	0.5oz wt/a	A			57.5a
COC	1% v/v	A			42.5b
6OUST	0.5oz wt/a	A	33.8-	28.8c	82.5c
MILESTONE VM	5fl oz/a	A			57.5a
ACCORD XRT	12fl oz/a	A			60.0a
LSD P=.05			5.88	8.56	7.83
Standard Deviation			3.90	5.68	5.08
CV			11.48	16.03	6.89
Levene's F			3.00	0.971	2.333
Levene's Prob(F)			0.038*	0.461	0.103
Skewness			-0.0664	1.2327*	-1.4869*
Kurtosis			-0.6055	0.5335	0.4636
Replicate F			1.712	0.819	0.435
Replicate Prob(F)			0.2072	0.5034	0.7316
Treatment F			1.219	30.310	269.516
Treatment Prob(F)			0.3477	0.0001	0.0001

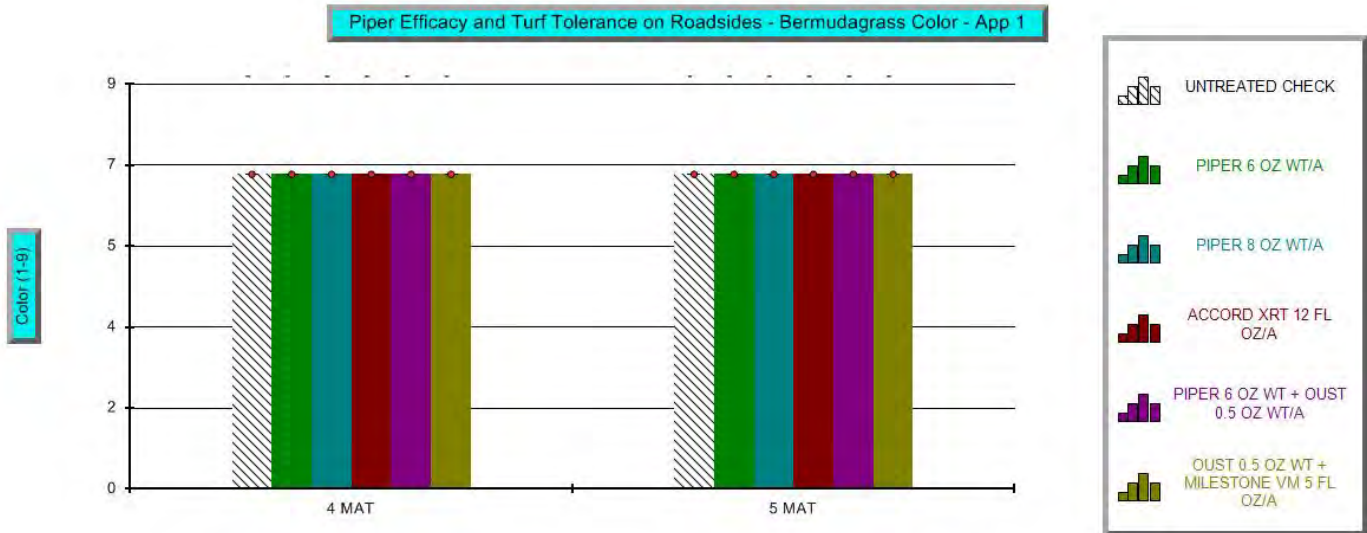
Chart 144. Bahiagrass (*Paspalum notatum*) cover through 6 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	Green Overall
Pest Code	GERCA	TRFIN	TRFIN	VICSA	
Pest Scientific Name	Geranium carol>	Trifolium inca>	Trifolium inca>	Vicia sativa	
Pest Name	Carolina geran>	Carnation clov>	Carnation clov>	Broad-leaved p>	
Rating Date	Jan-2-2017	Jan-2-2017	Jan-2-2017	Jan-2-2017	Feb-1-2017
Rating Type	CONTRO	GROUND	CONTRO	CONTRO	GROUND
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	32 32	32 32	32 32	32 32	62 5
Trt-Eval Interval	32 DA-A	32 DA-A	32 DA-A	32 DA-A	62 DA-A
ARM Action Codes	EC L05E	L05	EC L05E	EC L05E	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	18*	19*	20*
1UNTREATED CHECK			0.0	18.8a	0.0
2PIPER	6oz wt/a A		97.5b	5.5b	90.0a
COC	1% v/v A				91.3b
3PIPER	8oz wt/a A		100.0a	1.3b	98.8a
COC	1% v/v A				97.0ab
4ACCORD XRT	12fl oz/a A		0.0c	5.0b	50.0b
5PIPER	6oz wt/a A		100.0a	0.0b	100.0a
OUST	0.5oz wt/a A				92.0b
COC	1% v/v A				
6OUST	0.5oz wt/a A		99.5ab	0.0b	100.0a
MILESTONE VM	5fl oz/a A				100.0a
ACCORD XRT	12fl oz/a A				
LSD P=.05			2.01	8.48	13.16
Standard Deviation			1.30	5.63	8.54
CV			1.64	110.7	9.73
Levene's F			23.50	13.678	2.958
Levene's Prob(F)			0.001*	0.001*	0.055
Skewness			-1.6188*	2.3039*	-1.5351*
Kurtosis			0.6889	4.8797*	0.9093
Replicate F			1.490	2.058	0.429
Replicate Prob(F)			0.2670	0.1489	0.7362
Treatment F			4638.059	6.400	25.389
Treatment Prob(F)			0.0001	0.0023	0.0001

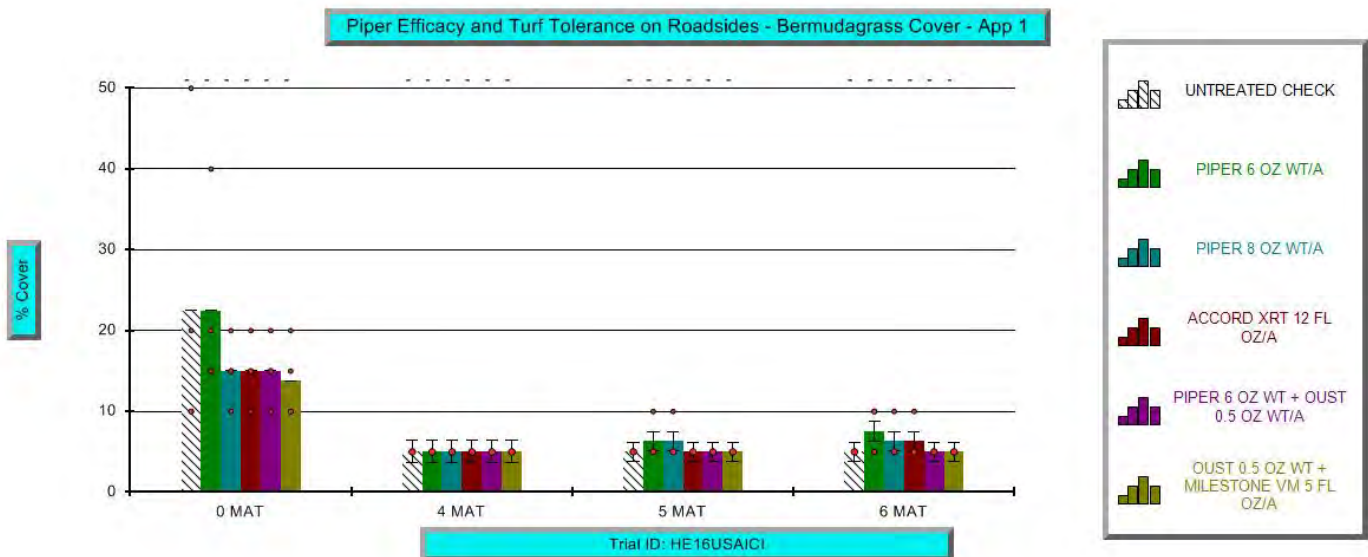
Chart 145. Bermudagrass (*Cynodon dactylon*) color at 4 and 5 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	LOLMU	PLALA	FESAR	GERCA	TRFIN
Pest Scientific Name	Lolium multifl>	Plantago lance>	Schedonorus ar>	Geranium carol>	Trifolium inca>
Pest Name	Bearded ryegra>	Buckhorn plant>	Tall fescue	Carolina geran>	Carnation clov>
Part Rated	PLANT P	PLANT P	PLANT P	PLANT P	PLANT P
Rating Date	Feb-1-2017	Feb-1-2017	Feb-1-2017	Feb-1-2017	Feb-1-2017
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	GROUND
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	62 5	62 5	62 5	62 5	62 5
Trt-Eval Interval	62 DA-A	62 DA-A	62 DA-A	62 DA-A	62 DA-A
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	23*	24*	25*
1UNTREATED CHECK			0.0	0.0	0.0
2PIPER	6oz wt/a A		96.3a	25.0b	27.5c
COC	1% v/v A				
3PIPER	8oz wt/a A		98.8a	30.0b	22.5c
COC	1% v/v A				
4ACCORD XRT	12fl oz/a A		0.0c	70.0a	70.0b
5PIPER	6oz wt/a A		100.0a	40.0b	75.0ab
OUST	0.5oz wt/a A				
COC	1% v/v A				
6OUST	0.5oz wt/a A		88.8b	77.5a	85.0a
MILESTONE VM	5fl oz/a A				
ACCORD XRT	12fl oz/a A				
LSD P=.05			5.84	15.91	12.81
Standard Deviation			3.79	10.33	8.32
CV			4.94	21.29	14.85
Levene's F			2.029	7.091	0.341
Levene's Prob(F)			0.142	0.002*	0.846
Skewness			-1.5594*	0.5261	-0.299
Kurtosis			0.581	-1.3239	-1.7337
Replicate F			0.783	0.297	0.578
Replicate Prob(F)			0.5262	0.8270	0.6403
Treatment F			517.522	21.281	48.181
Treatment Prob(F)			0.0001	0.0001	0.0001

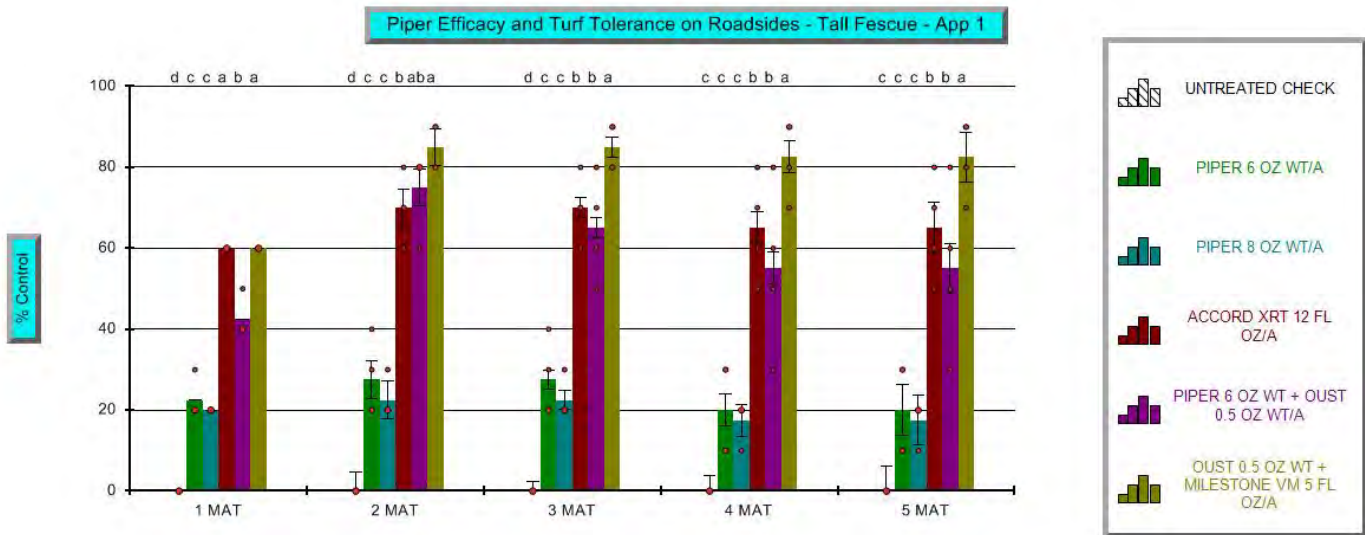
Chart 146. Bermudagrass (*Cynodon dactylon*) cover through 6 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	Green Overall
Pest Code	TRFDU	TRFIN	TRFDU	VICSA	
Pest Scientific Name	Trifolium dubi>	Trifolium inca>	Trifolium dubi>	Vicia sativa	
Pest Name	Small hop clov>	Carnation clov>	Small hop clov>	Broad-leaved p>	
Rating Date	Feb-1-2017	Feb-1-2017	Feb-1-2017	Feb-1-2017	Mar-1-2017
Rating Type	GROUND	CONTRO	CONTRO	CONTRO	GROUND
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	62 5	62 5	62 5	62 5	90 33
Trt-Eval Interval	62 DA-A	62 DA-A	62 DA-A	62 DA-A	90 DA-A
ARM Action Codes	L05	EC L05E	EC L05E	EC L05E	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	28*	29*	30*
1UNTREATED CHECK			25.0a	0.0	0.0
2PIPER	6oz wt/a A		1.5b	91.3a	96.3a
COC	1% v/v A				92.5b
3PIPER	8oz wt/a A		0.5b	100.0a	99.5a
COC	1% v/v A				100.0a
4ACCORD XRT	12fl oz/a A		16.3a	61.3b	57.5b
5PIPER	6oz wt/a A		0.0b	100.0a	100.0a
OUST	0.5oz wt/a A				95.0ab
COC	1% v/v A				
6OUST	0.5oz wt/a A		0.0b	100.0a	100.0a
MILESTONE VM	5fl oz/a A				99.5ab
ACCORD XRT	12fl oz/a A				20.0d
LSD P=.05			10.02	22.73	15.44
Standard Deviation			6.65	14.75	10.02
CV			92.25	16.3	11.06
Levene's F			2.353	5.57	35.031
Levene's Prob(F)			0.082	0.006*	0.001*
Skewness			1.4025*	-2.0626*	-2.196*
Kurtosis			0.3404	3.1558*	3.8753*
Replicate F			0.192	0.191	0.469
Replicate Prob(F)			0.9003	0.9002	0.7094
Treatment F			10.490	5.176	13.773
Treatment Prob(F)			0.0002	0.0117	0.0002

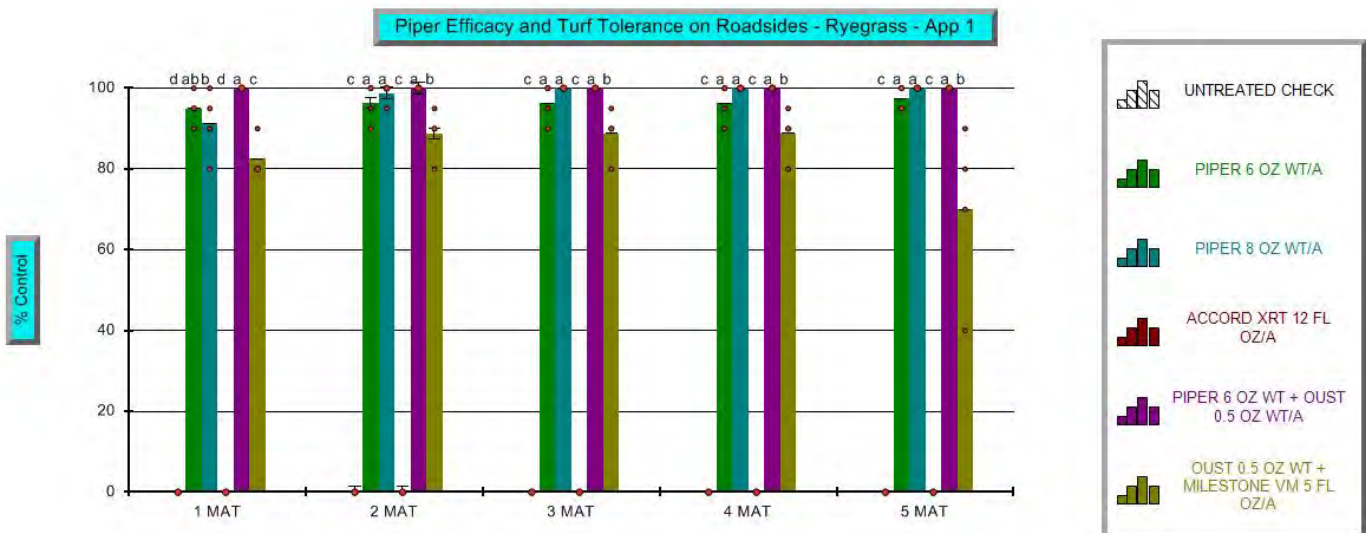
Chart 147. Tall fescue (*Schedonorus arundinaceus*) damage (control) through 5 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	TRFIN	LOLMU	CHPTA	TRFDU	PLALA
Pest Scientific Name	Trifolium inca>	Lolium multifi>	Chaerophyllum >	Trifolium dubi>	Plantago lance>
Pest Name	Carnation clov>	Bearded ryegra>	Hairyfruit che>	Small hop clov>	Buckhorn plant>
Part Rated		PLANT P			
Rating Date	Mar-1-2017	Mar-1-2017	Mar-1-2017	Mar-1-2017	Mar-1-2017
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	90 33	90 33	90 33	90 33	90 33
Trt-Eval Interval	90 DA-A	90 DA-A	90 DA-A	90 DA-A	90 DA-A
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	33*	34*	35*
1UNTREATED CHECK			0.0	0.0	0.0
2PIPER	6oz wt/a A		91.3a	96.3a	88.8ab
COC	1% v/v A				
3PIPER	8oz wt/a A		93.8a	100.0a	92.5ab
COC	1% v/v A				
4ACCORD XRT	12fl oz/a A		37.5b	0.0c	0.0c
5PIPER	6oz wt/a A		100.0a	100.0a	96.3a
OUST	0.5oz wt/a A				
COC	1% v/v A				
6OUST	0.5oz wt/a A		100.0a	88.8b	83.8b
MILESTONE VM	5fl oz/a A				
ACCORD XRT	12fl oz/a A				
LSD P=.05			21.22	5.58	10.31
Standard Deviation			13.78	3.62	6.69
CV			16.3	4.7	9.26
Levene's F			1.652	2.893	0.78
Levene's Prob(F)			0.213	0.059	0.555
Skewness			-2.0189*	-1.5584*	-1.4526*
Kurtosis			3.7115*	0.578	0.3441
Replicate F			1.906	0.762	3.674
Replicate Prob(F)			0.1825	0.5368	0.0437
Treatment F			14.862	571.095	147.586
Treatment Prob(F)			0.0001	0.0001	0.0001

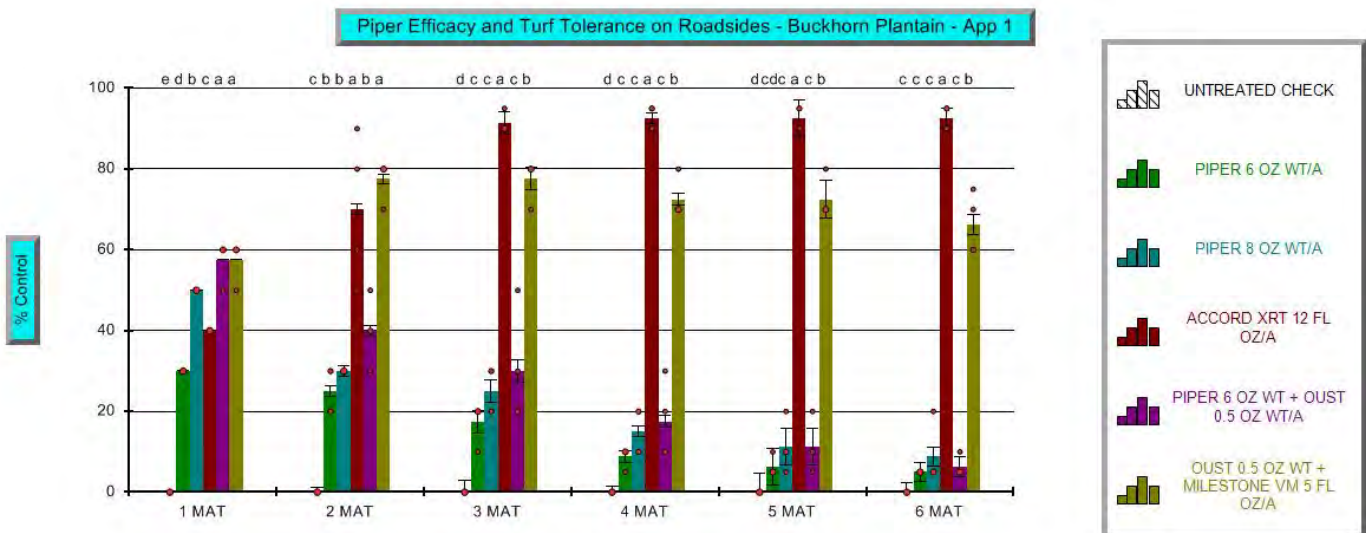
Chart 148. Annual ryegrass (*Lolium multiflorum*) control through 5 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	Green Overall	W Weed	W Weed
Pest Code	FESAR	GERCA		TRFIN	LOLMU
Pest Scientific Name	Schedonorus ar>	Geranium carol>		Trifolium inca>	Lolium multifl>
Pest Name	Tall fescue	Carolina geran>		Carnation clov>	Bearded ryegra>
Part Rated	PLANT P				PLANT P
Rating Date	Mar-1-2017	Mar-1-2017	Mar-31-2017	Mar-31-2017	Mar-31-2017
Rating Type	CONTRO	CONTRO	GROUND	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	90 33	90 33	120 63	120 63	120 63
Trt-Eval Interval	90 DA-A	90 DA-A	120 DA-A	120 DA-A	120 DA-A
ARM Action Codes	EC L05E	EC L05E	L05	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	38*	39*	60*
1UNTREATED CHECK			0.0	0.0	72.5a
2PIPER	6oz wt/a	A	27.5c	97.0a	50.0c
COC	1% v/v	A			86.3a
3PIPER	8oz wt/a	A	22.5c	100.0a	50.0c
COC	1% v/v	A			98.8a
4ACCORD XRT	12fl oz/a	A	70.0b	0.0c	66.3ab
5PIPER	6oz wt/a	A	65.0b	98.8a	48.8c
OUST	0.5oz wt/a	A			100.0a
COC	1% v/v	A			100.0a
6OUST	0.5oz wt/a	A	85.0a	88.8b	60.0b
MILESTONE VM	5fl oz/a	A			98.8a
ACCORD XRT	12fl oz/a	A			88.8b
LSD P=.05			13.71	5.28	9.86
Standard Deviation			8.90	3.43	6.54
CV			16.48	4.46	11.29
Levene's F			1.393	1.628	1.477
Levene's Prob(F)			0.284	0.219	0.246
Skewness			-0.1603	-1.566*	-0.6339
Kurtosis			-1.6509	0.5912	0.2657
Replicate F			0.842	0.414	2.500
Replicate Prob(F)			0.4967	0.7457	0.0991
Treatment F			38.305	636.117	9.273
Treatment Prob(F)			0.0001	0.0001	0.0003

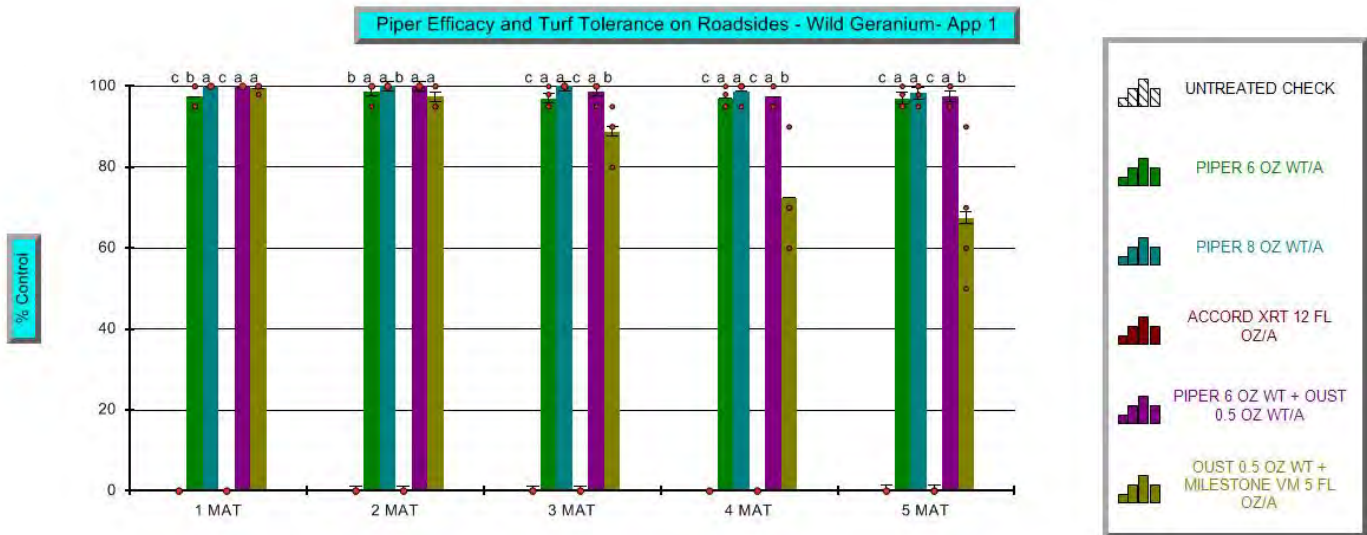
Chart 149. Buckhorn plantain (*Plantago lanceolata*) control through 6 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	CHPTA	TRFDU	PLALA	FESAR	GERCA
Pest Scientific Name	Chaerophyllum >	Trifolium dubi>	Plantago lance>	Schedonorus ar>	Geranium carol>
Pest Name	Hairyfruit che>	Small hop clov>	Buckhorn plant>	Tall fescue	Carolina geran>
Rating Date	Mar-31-2017	Mar-31-2017	Mar-31-2017	Mar-31-2017	Mar-31-2017
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	120 63	120 63	120 63	120 63	120 63
Trt-Eval Interval	120 DA-A	120 DA-A	120 DA-A	120 DA-A	120 DA-A
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	63*	64*	65*
1UNTREATED CHECK			0.0	0.0	0.0
2PIPER	6oz wt/a A		86.3ab	96.3a	8.8c
COC	1% v/v A				20.0c
3PIPER	8oz wt/a A		87.5ab	99.5a	15.0c
COC	1% v/v A				17.5c
4ACCORD XRT	12fl oz/a A		0.0c	52.5b	92.5a
5PIPER	6oz wt/a A		96.3a	99.8a	17.5c
OUST	0.5oz wt/a A				55.0b
COC	1% v/v A				
6OUST	0.5oz wt/a A		78.8b	100.0a	72.5b
MILESTONE VM	5fl oz/a A				82.5a
ACCORD XRT	12fl oz/a A				72.5b
LSD P=.05			13.76	16.57	8.78
Standard Deviation			8.93	10.75	5.70
CV			12.81	12.0	13.82
Levene's F			1.576	11.285	2.222
Levene's Prob(F)			0.232	0.001*	0.116
Skewness			-1.3071*	-2.1477*	0.491
Kurtosis			0.0513	3.5911*	-1.6905
Replicate F			4.068	0.460	1.064
Replicate Prob(F)			0.0330	0.7153	0.4006
Treatment F			78.149	14.956	181.923
Treatment Prob(F)			0.0001	0.0001	0.0001

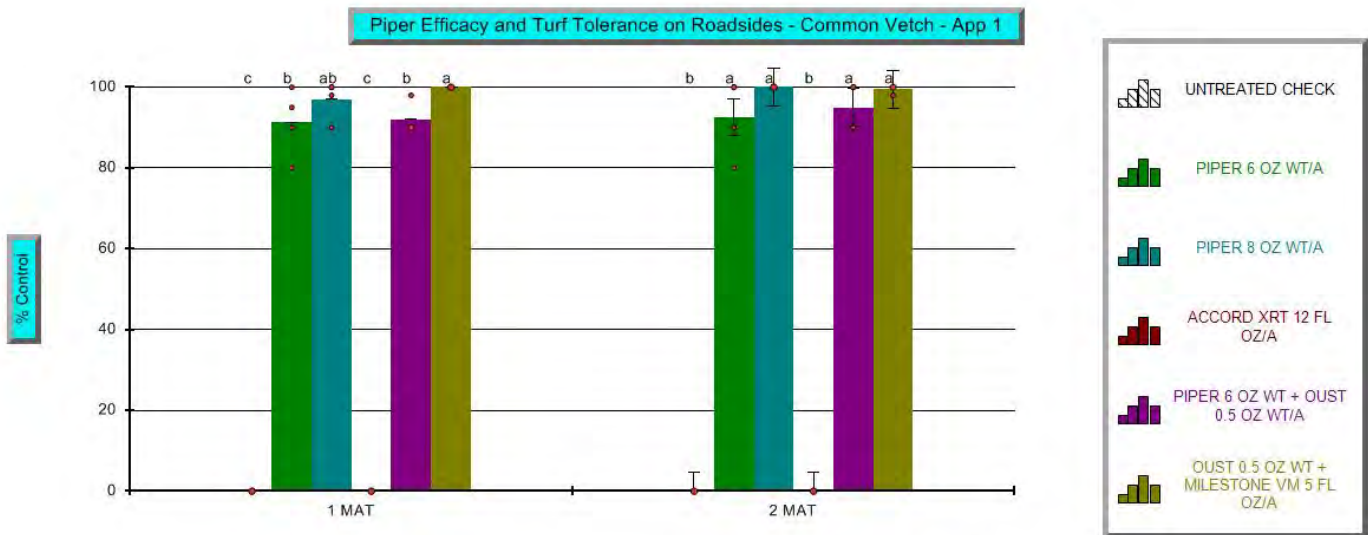
Chart 150. Carolina geranium (*Geranium carolinianum*) control through 5 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Scientific Name					Green Overall
Pest Name					
Crop Code	PASNO	PASNO	CYNDA	CYNDA	
BBCH Scale	BGRM	BGRM	BGRM	BGRM	
Crop Scientific Name	Paspalum notat>	Paspalum notat>	Cynodon dactyl>	Cynodon dactyl>	
Crop Name	Water couch	Water couch	Common bermuda>	Common bermuda>	
Part Rated	PLANT C	PLANT C	PLANT C	PLANT C	
Rating Date	Mar-31-2017	Mar-31-2017	Mar-31-2017	Mar-31-2017	May-1-2017
Rating Type	COLOR	GROUND	COLOR	GROUND	GROUND
Rating Unit	1-9	%	1-9	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	120 63	120 63	120 63	120 63	151 94
Trt-Eval Interval	120 DA-A	120 DA-A	120 DA-A	120 DA-A	151 DA-A
ARM Action Codes	L05	L05	L05	L05	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	68*	69*	70*
1UNTREATED CHECK			7.0a	13.8c	7.0-
2PIPER	6oz wt/a A		6.8a	20.0bc	7.0-
COC	1% v/v A				5.0-
3PIPER	8oz wt/a A		6.5ab	21.3bc	7.0-
COC	1% v/v A				5.0-
4ACCORD XRT	12fl oz/a A		6.5ab	27.5ab	7.0-
5PIPER	6oz wt/a A		6.8a	27.5ab	7.0-
OUST	0.5oz wt/a A				5.0-
COC	1% v/v A				
6OUST	0.5oz wt/a A		6.0b	32.5a	7.0-
MILESTONE VM	5fl oz/a A				5.0-
ACCORD XRT	12fl oz/a A				
LSD P=.05			0.59	7.70	
Standard Deviation			0.39	5.11	0.00
CV			5.99	21.52	0.0
Levene's F			1.20	0.452	0.00
Levene's Prob(F)			0.349	0.806	
Skewness			-1.0672*	-0.3891	
Kurtosis			0.2953	-0.6271	
Replicate F			6.786	17.500	0.000
Replicate Prob(F)			0.0041	0.0001	1.0000
Treatment F			3.000	6.894	0.000
Treatment Prob(F)			0.0450	0.0016	1.0000

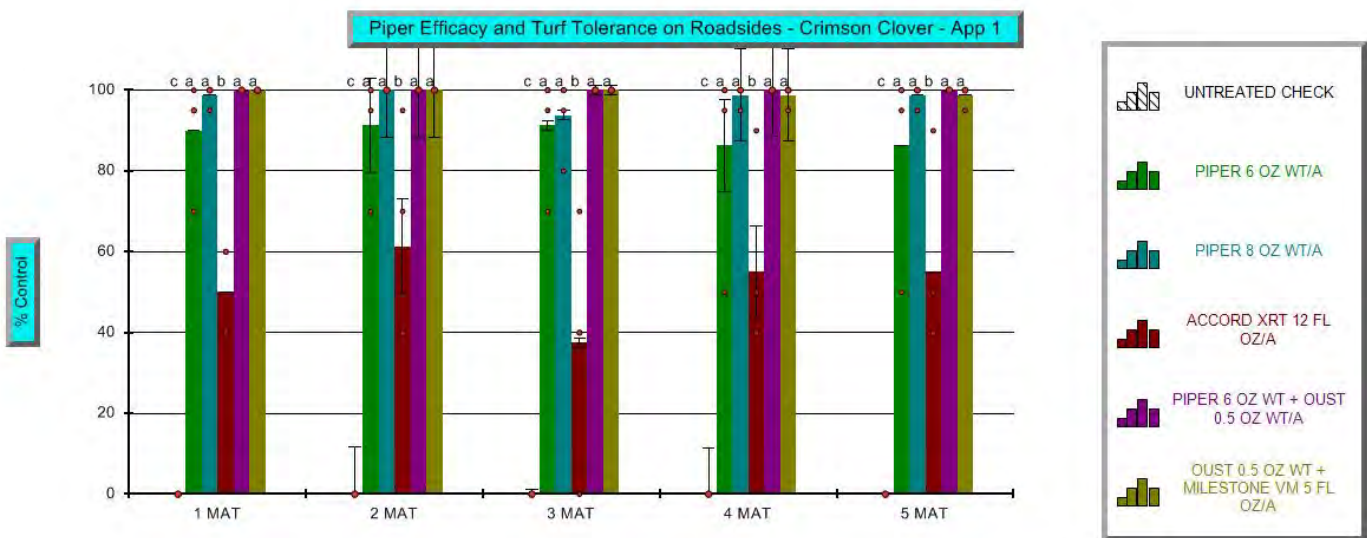
Chart 151. Common vetch (*Vicia sativa*) control at 1 and 2 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	TRFIN	LOLMU	CHPTA	TRFDU	PLALA
Pest Scientific Name	Trifolium inca>	Lolium multifi>	Chaerophyllum >	Trifolium dubi>	Plantago lance>
Pest Name	Carnation clov>	Bearded ryegra>	Hairyfruit che>	Small hop clov>	Buckhorn plant>
Part Rated		PLANT P			
Rating Date	May-1-2017	May-1-2017	May-1-2017	May-1-2017	May-1-2017
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	151 94	151 94	151 94	151 94	151 94
Trt-Eval Interval	151 DA-A	151 DA-A	151 DA-A	151 DA-A	151 DA-A
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	87*	88*	89*
1UNTREATED CHECK			0.0	0.0	0.0
2PIPER	6oz wt/a A		86.3a	97.5a	78.8a
COC	1% v/v A				
3PIPER	8oz wt/a A		98.8a	100.0a	85.0a
COC	1% v/v A				
4ACCORD XRT	12fl oz/a A		55.0b	0.0c	0.0b
5PIPER	6oz wt/a A		100.0a	100.0a	91.3a
OUST	0.5oz wt/a A				
COC	1% v/v A				
6OUST	0.5oz wt/a A		98.8a	70.0b	63.8a
MILESTONE VM	5fl oz/a A				
ACCORD XRT	12fl oz/a A				
LSD P=.05			26.25	15.15	30.14
Standard Deviation			17.04	9.83	19.56
CV			19.41	13.38	30.69
Levene's F			1.207	4.25	3.67
Levene's Prob(F)			0.348	0.017*	0.028*
Skewness			-1.6123*	-1.2554*	-0.8511
Kurtosis			0.8348	-0.1908	-0.9154
Replicate F			0.027	0.914	1.318
Replicate Prob(F)			0.9936	0.4634	0.3140
Treatment F			5.055	76.500	14.363
Treatment Prob(F)			0.0127	0.0001	0.0002

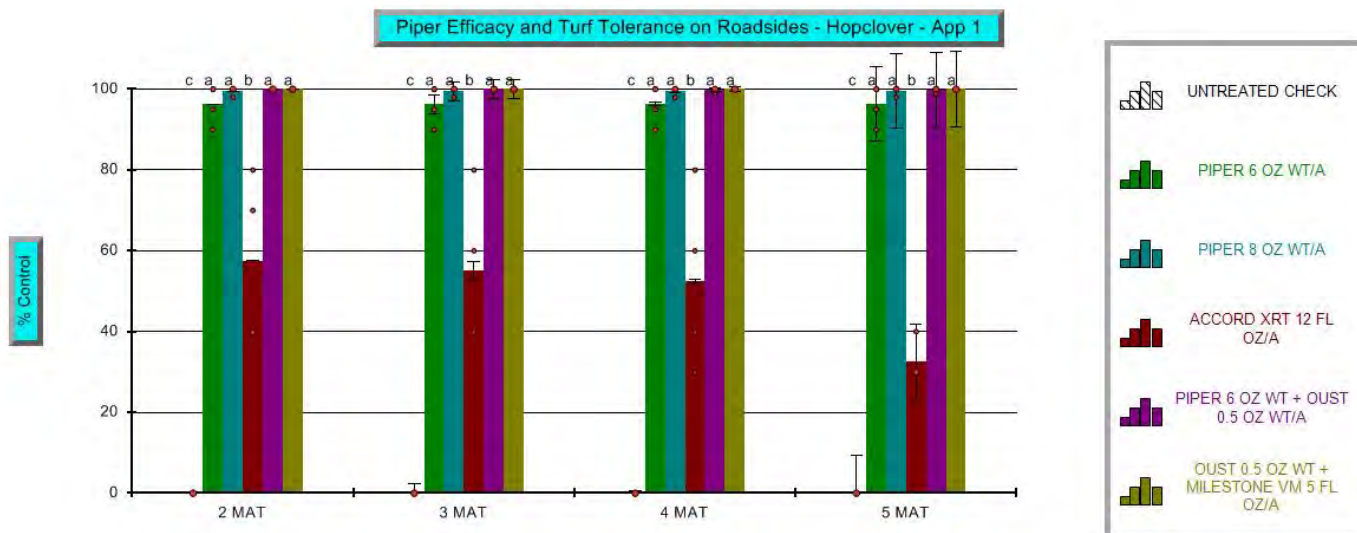
Chart 152. Crimson clover (*Trifolium incarnatum*) control through 5 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed			
Pest Code	FESAR	GERCA			
Pest Scientific Name	Schedonorus ar>	Geranium carol>			
Pest Name	Tall fescue	Carolina geran>			
Crop Code			PASNO	PASNO	CYNDA
BBCH Scale			BGRM	BGRM	BGRM
Crop Scientific Name			Paspalum notat>	Paspalum notat>	Cynodon dactyl>
Crop Name			Water couch	Water couch	Common bermuda>
Part Rated	PLANT P		PLANT C	PLANT C	PLANT C
Rating Date	May-1-2017	May-1-2017	May-1-2017	May-1-2017	May-1-2017
Rating Type	CONTRO	CONTRO	COLOR	GROUND	COLOR
Rating Unit	%	%	1-9	%	1-9
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	151 94	151 94	151 94	151 94	151 94
Trt-Eval Interval	151 DA-A	151 DA-A	151 DA-A	151 DA-A	151 DA-A
ARM Action Codes	EC L05E	EC L05E	L05	L05	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	92*	93*	94*
1UNTREATED CHECK			0.0	0.0	7.0a
2PIPER	6oz wt/a	A	20.0c	97.0a	6.8ab
COC	1% v/v	A			20.0c
3PIPER	8oz wt/a	A	17.5c	98.3a	6.5abc
COC	1% v/v	A			21.3bc
4ACCORD XRT	12fl oz/a	A	65.0ab	0.0c	7.0a
5PIPER	6oz wt/a	A	55.0b	97.5a	6.0c
OUST	0.5oz wt/a	A			28.8ab
COC	1% v/v	A			
6OUST	0.5oz wt/a	A	82.5a	67.5b	6.3bc
MILESTONE VM	5fl oz/a	A			32.5a
ACCORD XRT	12fl oz/a	A			
LSD P=.05			18.61	12.27	0.59
Standard Deviation			12.08	7.96	0.39
CV			25.16	11.05	5.99
Levene's F			1.904	5.228	1.44
Levene's Prob(F)			0.162	0.008*	0.258
Skewness			0.0583	-1.2341*	-1.0672*
Kurtosis			-1.5586	-0.163	0.2953
Replicate F			1.829	0.916	4.643
Replicate Prob(F)			0.1956	0.4624	0.0173
Treatment F			22.234	113.098	4.286
Treatment Prob(F)			0.0001	0.0001	0.0127
					7.97
					5.29
					21.7
					0.967
					0.464
					-0.5233
					-0.2144
					12.047
					0.0003
					7.392
					0.0011
					0.000
					1.0000
					0.000
					1.0000

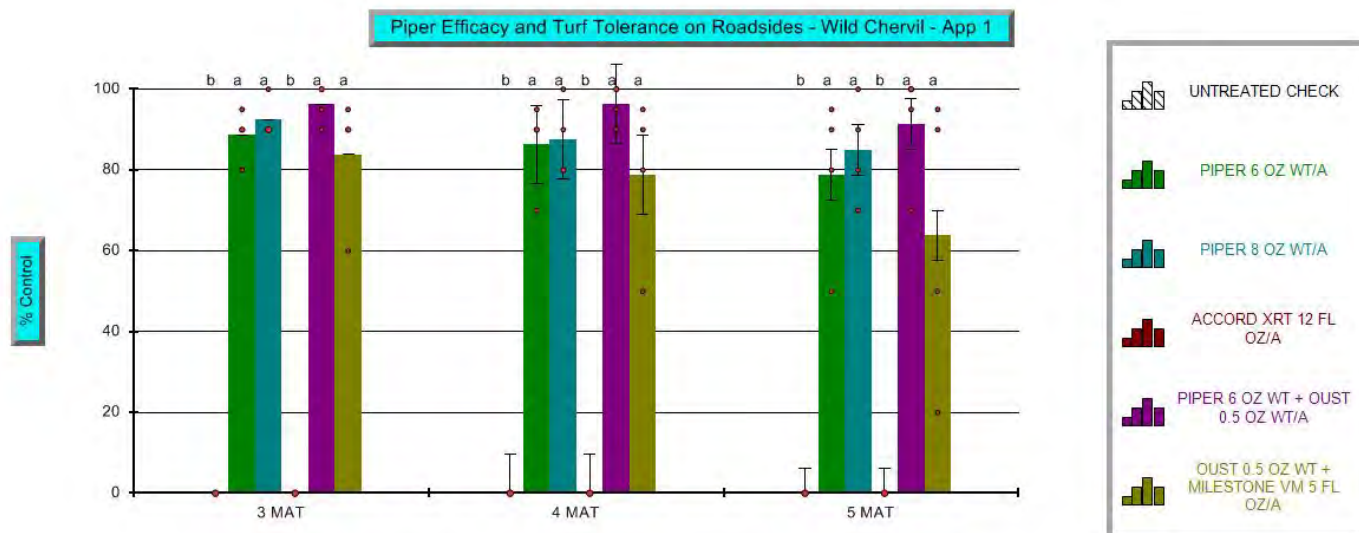
Chart 153. Little hop clover (*Trifolium dubium*) control through 5 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type		W Weed	W Weed		W Weed		
Pest Code		DIGAD	SETGP		PLALA		
Pest Scientific Name		Digitaria cili>	Setaria genicu>	Green Overall	Plantago lance>		
Pest Name		Henry crabgrass	Slender pigeon>		Buckhorn plant>		
Crop Code	CYNDA						
BBCH Scale	BGRM						
Crop Scientific Name	Cynodon dactyl>						
Crop Name	Common bermuda>						
Part Rated	PLANT C						
Rating Date	May-1-2017	May-1-2017	May-1-2017	Jun-1-2017	Jun-1-2017		
Rating Type	GROUND	GROUND	GROUND	GROUND	CONTRO		
Rating Unit	%	%	%	%	%		
Number of Subsamples	1	1	1	1	1		
Days After First/Last Applic.	151 94	151 94	151 94	182 125	182 125		
Trt-Eval Interval	151 DA-A	151 DA-A	151 DA-A	182 DA-A	182 DA-A		
ARM Action Codes	L05	L05	L05	L05	EC L05E		
Trt Treatment	Rate	Appl					
No. Name	Rate Unit	Code	97*	98*	99*		
1UNTREATED CHECK			5.0-	1.3d	1.3c	73.8a	0.0
2PIPER	6oz wt/a	A	6.3-	8.8bc	7.5a	61.3e	5.0c
COC	1% v/v	A					
3PIPER	8oz wt/a	A	6.3-	11.3ab	7.5a	65.0cd	8.8c
COC	1% v/v	A					
4ACCORD XRT	12fl oz/a	A	5.0-	3.8cd	2.5bc	68.8b	92.5a
5PIPER	6oz wt/a	A	5.0-	16.3a	6.3ab	62.5de	6.3c
OUST	0.5oz wt/a	A					
COC	1% v/v	A					
6OUST	0.5oz wt/a	A	5.0-	11.3ab	5.0abc	67.5bc	66.3b
MILESTONE VM	5fl oz/a	A					
ACCORD XRT	12fl oz/a	A					
LSD P=.05			1.95	5.15	3.97	3.62	7.92
Standard Deviation			1.29	3.42	2.64	2.40	5.14
CV			23.83	39.04	52.7	3.61	14.39
Levene's F			0.80	1.20	0.667	0.216	1.682
Levene's Prob(F)			0.564	0.349	0.654	0.951	0.206
Skewness			3.22*	0.5576	0.0	0.3594	0.598
Kurtosis			9.124*	-0.4926	-0.9459	-0.9371	-1.5652
Replicate F			2.500	13.929	2.800	6.928	0.803
Replicate Prob(F)			0.0991	0.0001	0.0759	0.0038	0.5158
Treatment F			1.000	10.286	3.960	14.494	253.063
Treatment Prob(F)			0.4509	0.0002	0.0173	0.0001	0.0001

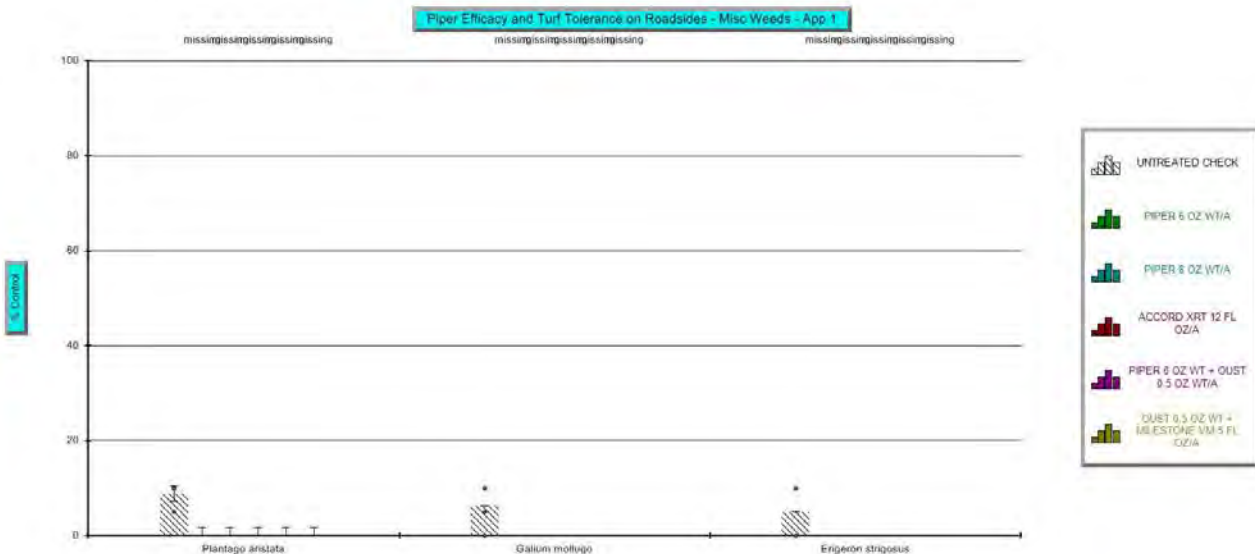
Chart 154. Wild chervil (*Chaerophyllum tainturieri*) control through 5 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type			W Weed	W Weed	W Weed
Pest Code			DIGAD	SETGP	PLAAR
Pest Scientific Name			Digitaria cili>	Setaria genicu>	Plantago arist>
Pest Name			Henry crabgrass	Slender pigeon>	Bracted planta>
Crop Code	PASNO	CYNDA			
BBCH Scale	BGRM	BGRM			
Crop Scientific Name	Paspalum notat>	Cynodon dactyl>			
Crop Name	Water couch	Common bermuda>			
Part Rated	PLANT C	PLANT C			
Rating Date	Jun-1-2017	Jun-1-2017	Jun-1-2017	Jun-1-2017	Jun-1-2017
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	182 125	182 125	182 125	182 125	182 125
Trt-Eval Interval	182 DA-A	182 DA-A	182 DA-A	182 DA-A	182 DA-A
ARM Action Codes	L05	L05	L05	L05	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	102*	103*	104*
1UNTREATED CHECK			20.0e	5.0-	1.3c
2PIPER	6oz wt/a A		22.5de	7.5-	17.5ab
COC	1% v/v A				7.5ab
3PIPER	8oz wt/a A		26.3cd	6.3-	15.0ab
COC	1% v/v A				8.8a
4ACCORD XRT	12fl oz/a A		35.0a	6.3-	10.0b
5PIPER	6oz wt/a A		28.8bc	5.0-	20.0a
OUST	0.5oz wt/a A				6.8ab
COC	1% v/v A				8.8a
6OUST	0.5oz wt/a A		33.8ab	5.0-	12.5ab
MILESTONE VM	5fl oz/a A				5.0bc
ACCORD XRT	12fl oz/a A				4.0bc
LSD P=.05			6.09	2.63	7.93
Standard Deviation			4.04	1.75	5.26
CV			14.58	29.97	41.42
Levene's F			0.741	2.00	0.624
Levene's Prob(F)			0.603	0.127	0.684
Skewness			-0.8895	1.9104*	0.3578
Kurtosis			1.2454	1.7922	0.2423
Replicate F			15.043	1.818	2.444
Replicate Prob(F)			0.0001	0.1871	0.1043
Treatment F			8.796	1.364	6.353
Treatment Prob(F)			0.0005	0.2924	0.0023
					0.0031
					0.0009

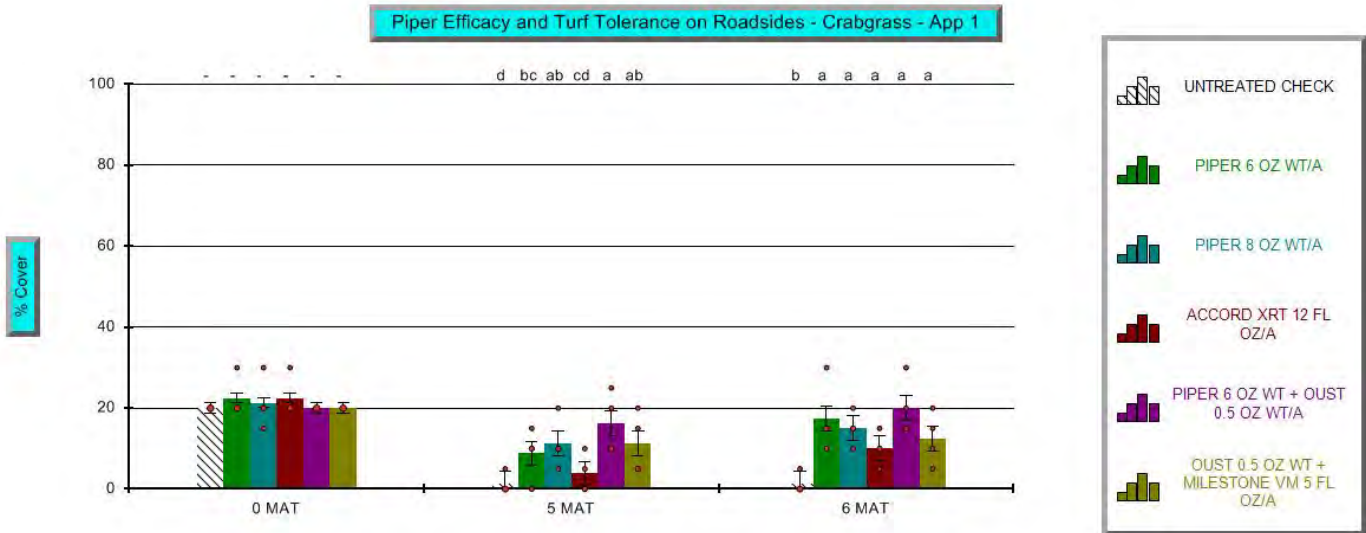
Chart 155. Daisy fleabane (*Erigeron strigosus*), smooth bedstraw (*Galium mollugo*), and bracted plantain (*Plantago aristata*) cover at 6 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed
Pest Code	GALMO	ERIST	LESST
Pest Scientific Name	Galium mollugo	Erigeron annuu>	Kummerowia str>
Pest Name	Smooth bedstraw	Rough fleabane	Common lespede>
Rating Date	Jun-1-2017	Jun-1-2017	Jul-27-2017
Rating Type	GROUND	GROUND	GROUND
Rating Unit	%	%	%
Number of Subsamples	1	1	1
Days After First/Last Applic.	182 125	182 125	238 181
Trt-Eval Interval	182 DA-A	182 DA-A	181 DA-B
ARM Action Codes	L05	L05	L05
Trt Treatment	Rate	Appl	
No. Name	Rate Unit	Code	
1UNTREATED CHECK			107*
2PIPER	6oz wt/a A		108*
COCC	1% v/v A		131*
3PIPER	8oz wt/a A		
COCC	1% v/v A		
4ACCORD XRT	12fl oz/a A		
5PIPER	6oz wt/a A		
OUST	0.5oz wt/a A		
COCC	1% v/v A		
6OUST	0.5oz wt/a A		
MILESTONE VM	5fl oz/a A		
ACCORD XRT	12fl oz/a A		
LSD P=.05	5.47	11.35	5.53
Standard Deviation	3.63	7.53	3.67
CV	43.32	120.47	172.6
Levene's F	7.01	12.098	0.335
Levene's Prob(F)	0.001*	0.001*	0.885
Skewness	0.9071	1.7369*	1.5096*
Kurtosis	-0.5092	2.0353*	1.3022
Replicate F	1.666	2.253	0.259
Replicate Prob(F)	0.2168	0.1242	0.8537
Treatment F	29.480	2.664	0.333
Treatment Prob(F)	0.0001	0.0646	0.8853

Chart 156. Southern crabgrass (*Digitaria ciliaris*) cover through 6 months following herbicide applications on December 1, 2016.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type

W, Weed, G-BYRW7, G-WedStg = Weed or volunteer crop

Pest Code

PLALA, *Plantago lanceolata*, Buckhorn plantain = US
 DIGAD, *Digitaria ciliaris*, Henry crabgrass = US
 FESAR, *Schedonorus arundinaceus*, Tall fescue = US
 LOLMU, *Lolium multiflorum*, Bearded ryegrass = US
 GERCA, *Geranium carolinianum*, Carolina geranium = US
 TRFIN, *Trifolium incarnatum*, Carnation clover = US
 VICSA, *Vicia sativa*, Broad-leaved purple vetch = US
 TRFDU, *Trifolium dubium*, Small hop clover = US
 CHPTA, *Chaerophyllum tainturieri*, Hairyfruit chervil = US
 SETGP, *Setaria geniculata paucisetata*, knotroot foxtail (slender pigeongrass) = US; Syn. *Setaria parviflora*
 PLAAR, *Plantago aristata*, Bracted plantain = US
 GALMO, *Galium mollugo*, Smooth bedstraw = US
 ERIST, *Erigeron annuus strigosus*, Rough fleabane = US

Crop Code

CYNDA, BGRM, *Cynodon dactylon*, Common bermudagrass = US
 PASNO, BGRM, *Paspalum notatum*, Water couch (bahiagrass) = US

Part Rated

PLANT = plant
 C = Crop is Part Rated
 P = Pest is Part Rated

Rating Type

GROUND = groundcover
 CONTRO = control / burndown or knockdown
 COLOR = color

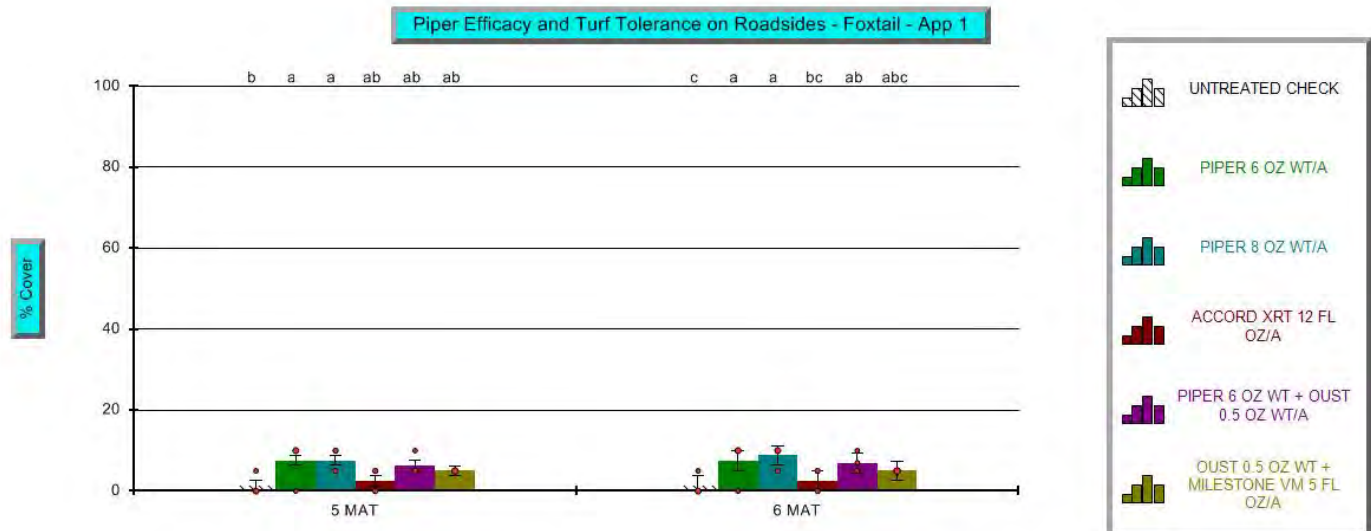
Rating Unit

% = percent; 1-9 = 1-9 index/scale

ARM Action Codes

L05 = Perform 5% Least Significant Difference mean separation on Standardized Summary
 EC = Do not analyze untreated check, while still reporting treatment mean on AOV Means Table
 L05E = Perform 5% Least Significant Difference mean separation on Standardized Summary, and exclude untreated treatments from AOV

Chart 156. Knotroot foxtail (*Setaria parviflora*) cover through 6 months following herbicide applications on December 1, 2016.



**PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF
Application B**

General Trial Information

Trial ID: VUSA2016PIPERPR04.02 2016-17 Trial Year:
 Protocol ID: VUSA2016PIPERPR04.02 Investigator: Victor Maddox
 Project ID: Sponsor Contact: Frank
Carey

Trial Location

Address: Hwy 25 South
City: Louisville **Country:** USA United States
State/Prov.: Mississippi

Latitude of LL Corner °: 33.08578 N
Longitude of LL Corner °: 89.09899 W

Directions:

West side of Hwy 25 south of Louisville MS.

No.	Guideline	Description
1.	ADM-C-PU B	Confidentiality - Public Trial - No Secrecy Agreement Required

Objectives:

Evaluate Piper for winter annual weed control in unimproved roadside turf when applied at two different growth stages. Primary objective is Italian (annual) ryegrass (*Lolium multiflorum*) control with turf tolerance a major consideration.

Results and Discussion:

This study includes two applications, **Application A** (297-315) and **Application B** (316-334). The following discussion covers the first application, **Application B**. **Overall Conclusions** for both studies can be found at the end of this section. This study was conducted in unimproved bahiagrass and bermudagrass turf with heavy annual ryegrass pressure.

Overall Cover. At 0 WAT on January 27, 2017, overall green cover ranged from 63.8 to 68.8 percent on average (Chart 158). Significant reductions in cover were observed at 31 DAT compared to the untreated plots, particularly cover in the standard treatment (Oust + Milestone + Accord) (8.8%) and Piper plus Accord (11.3%) plots. It is likely Accord contributed significantly to this response, as green cover was roughly double the cover of Application A at the time of applications. Overall cover increased by 61 DAT with a similar pattern, but differences were not significant. At 91 DAT, cover was significantly less in all treatments compared to the untreated. By 123 DAT, cover significantly less in only plots receiving Piper, alone or in combination with other products. This may be some indication of residual. A similar pattern was observed at 151 and 181 DAT. Since bahiagrass (*Paspalum notatum*) and bermudagrass (*Cynodon dactylon*) were dormant at the time of applications, this reduction was primarily due to weed control, and illustrates a positive reduction in green cover. Unlike Application A, this reduction in cover was significant in plots treated with Accord alone. The difference was weed germination prior to the application.

Turf Response to Treatments. During greenup at 61 DAT (2 MAT), bahiagrass discoloration was observed and all herbicide treated were significantly discolored compared to the untreated plots (Chart 159). By 91 DAT, color was recovering, but discoloration was still observable. Discoloration was not observed after 123 DAT. There was significant increases in bahiagrass cover in all plots treated with herbicide at 61 and 91 DAT (Chart 160). This pattern was similar at 123, 151, and 181 DAT, but plots receiving 8 oz of Piper or Piper plus Oust were not significantly less than the untreated plots.

Color ratings were recorded at 61 and 91 DAT, but no discoloration on bermudagrass was observed during the study (**Chart 161**). Bermudagrass cover was similar across all treatments at 61, 91, 123, 151, and 181 DAT. Cover did not exceed 8.8 percent on average during the study.

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Results and Discussion (Continued):

Turf Response to Treatments (Continued). Tall fescue (*Schedonorus arundinaceus*) cover at 0 DAT (January 27, 2017) ranged from 18 to 27.5 percent. Damage (control) was observed at 31 DAT (1 MAT) in all herbicide treated plots (Chart 163), but particularly plots treated with Piper plus Accord or Oust plus Milestone plus Accord. This pattern was similar at 61 and 91 DAT. As with Application A applied December 1, this indicates that standard treatments used on roadsides with Accord and/or Oust at the rates used in this study can be detrimental tall fescue cover. Again, this may be an issue where tall fescue is desired. But if flowering height of tall fescue is an issue close to the paved surface, control could be desirable.

Annual Ryegrass Control. Ryegrass was small and covered only 5 percent of plots at the time of application on January 27, 2017. At 31 DAT (1 MAT), all herbicide treatments were effective controlling ryegrass with control ranging from 97.5 to 100 percent on average (Chart 164). This pattern was similar at 61 DAT. By 91 DAT, ryegrass control was down to 73.8 percent in plots treated with Accord alone. This is likely due to Accords lack of residual.

Buckhorn Plantain Control. Plantain was a major weed in plots at 0 DAT ranging from 17.5 to 22.5 percent cover. At 31 DAT (1 MAT), significant control was observed, particularly treatments containing Piper plus Accord (82.5%) or Oust plus Milestone plus Accord (77.5%) (Chart 165). By 61 DAT (2 MAT), both treatments containing Accord were both significant but not compared to Accord alone. A similar pattern was observed at 91 (3 MAT). By 123, regrowth was observed in plots treated with Accord alone and control was reduced. This pattern was similar for 151 and 181 DAT. It should be noted that 100 percent control on average was not observed for any treatment, but the highest control achieved was 98.8 by the standard treatment at 151 DAT.

Broadleaf Winter Annual Weed Responses. Carolina geranium (*Geranium carolinianum*) (Chart 166) was up at the time of application and significant control was observed at 31 DAT. However, the 6 oz rate of Piper was not as effective (86.3%). A similar trend was observed at 61 and 91 DAT, but some regrowth was observed in plots treated with Accord alone.

Crimson clover (*Trifolium incarnatum*) (Chart 167) and little hop clover (*Trifolium dubium*) (Chart 168) were up at the time of application and significant weeds with cover ranging from 7.5 to 17.5 and 22.5 to 35 percent, respectively, within the study area at the time of application. At 32 DAT, all treatments showed significant control ranging from 90 to 100 percent and 91.3 to 100 percent, respectively. Crimson clover showed a similar response at 61 and 91 DAT. However, 6 oz Piper or Accord alone treatments were not as effective on little hop clover and regrowth was observed in plots treated with Accord alone following the 31 DAT ratings.

Wild Chervil (*Chaerophyllum tainturieri*) (Chart 169) cover ranged from 5 to 6.3 percent on average at the time of applications. All herbicide treatments had activity, but Piper alone was not as effective at 31, 62, and 91 DAT. However, Piper plus Accord or Oust plus Milestone plus Accord obtained 100 control through 91 DAT.

Daisy fleabane (*Erigeron strigosus*), smooth bedstraw (*Galium mollugo*), and bracted plantain (*Plantago aristata*) (Chart 170) cover showed interesting responses to herbicide treatments at 123 DAT. As with Application A, daisy fleabane seemed to have been released with Piper treatments at either rate with 8.5 and 11.0 percent cover, respectively. Cover in the Piper plus Oust treatment was similar to the control (5.3%). However, Piper showed some control of smooth bedstraw, with all herbicide treatments with less cover than the untreated, except Accord alone. Accord seemed to have released smooth bedstraw with 10.5% cover compared to 6.3% in the untreated plots. Piper may also have some activity on bracted plantain, as well, but all treatments had significantly less cover compared to the untreated (8.8%). However, these data only represents one date in time and more research is needed on these species for conclusive results.

Warm-season Annual Grasses. Similar to Application A, southern crabgrass (*Digitaria ciliaris*) (Chart 171) and knotroot foxtail (*Setaria parviflora*) (Chart 172) seemed to have been released in this study based upon cover at 91 and 123 DAT. At both dates for both species cover in the untreated plots was less than herbicide treated plots. This was most pronounced in plots treated with Accord or the standard treatment. It is likely that residual from these treatments was not present at the time of spring germination for these grasses and fewer competing weeds in the plots released both species. This could be a consideration when applying these products under the conditions of this study.

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Results and Discussion (Continued):

Japanese Lespedeza Response. Ratings were taken on Japanese lespedeza (*Kummerowia striata*) in plots of both Applications 8 and 6 MAT, respectively (Chart 173). Japanese lespedeza responded slightly better to the second applications based upon cover, but Accord alone seemed to release lespedeza. Cover was low, so more research is needed to determine the significance, if any, of this response.

Overall Conclusions:

Based upon this study, bahiagrass discoloration during spring green-up should be expected with these treatments under the conditions of this study following either application date. Bermudagrass should no discoloration flowering either application. Tall fescue was damaged significantly and should be a consideration depending upon its desirability within the application area. Ryegrass control was best overall following the January application, but not with Accord alone. Accord was applied two early, both in December and January in this study, so not a preferred treatment at either application date for ryegrass control. A number of weeds responded well to the treatments. Buckhorn plantain seems to respond best to treatments with Accord, although regrowth was observed in plots with Accord alone. Without residual, annual weed species typically recovered at some point following application with Accord. More research is needed on some species observed in the study, due to low cover. In conclusion, some treatments were effective controlling annual ryegrass, but bahiagrass discoloration was both observable and recoverable both in color and cover. Bermudagrass showed little response to treatments in the study. It should also be noted that the drought prior to the December application influenced Application A and years with wetter falls could yield variable results.

Application Description

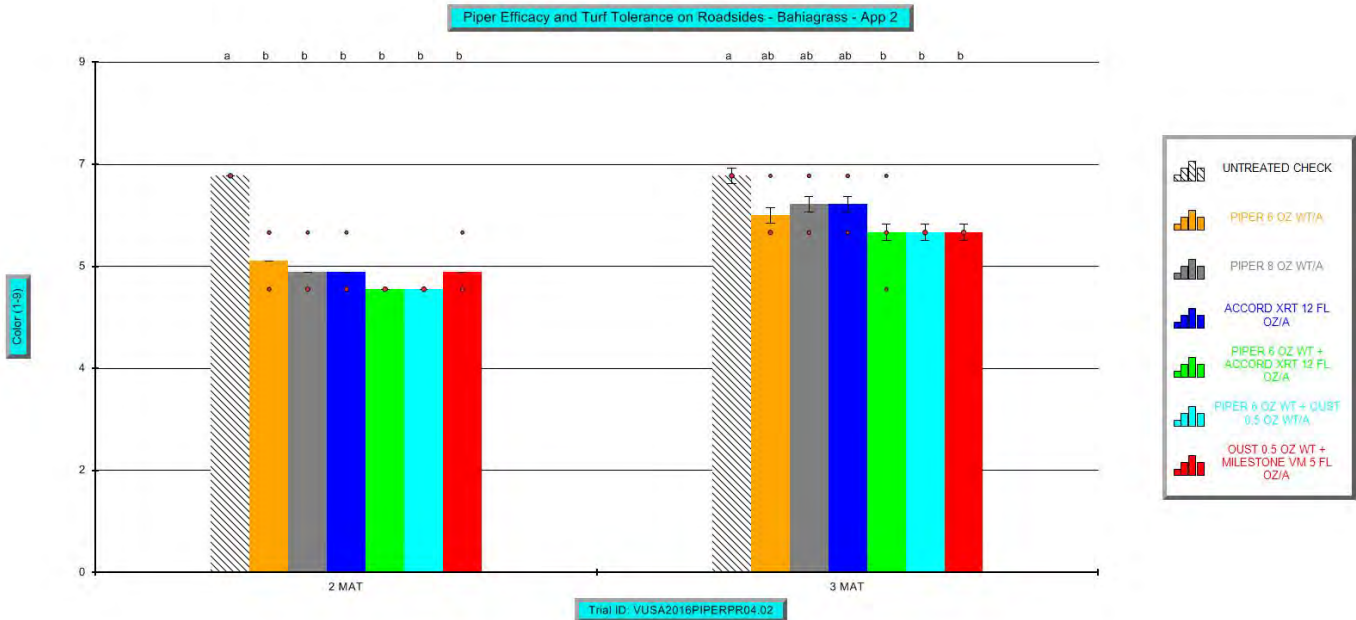
	A	B
Application Date:	Dec-1-2016	Jan-27-2017
Appl. Start Time:	11:00 AM	2:00 PM
Interval to Prev. Appl., Unit:		57 DAYS
Application Method:	SPRAY	SPRAY
Application Timing:	POSPRE	POSPRE
Application Placement:	FOLIAR	FOLIAR
Applied By:	VMaddox	VMaddox
Air Temperature, Unit:	56 F	46 F
% Relative Humidity:	55	40
Wind Velocity, Unit:	5 MPH	9 MPH
Wind Direction:	N	W
Dew Presence (Y/N):	N no	N no
Soil Moisture:	NORMAL	NORMAL
% Cloud Cover:	0	80

Application Equipment

	A	B
Appl. Equipment:	BASB	BASB
Equipment Type:	backpa	BACCAI
Operation Pressure, Unit:	20 PSI	20 PSI
Nozzle Type:	FLAFAN	FLAFAN
Nozzle Size:	8003	8003
Nozzle Spacing, Unit:	19 IN	19 IN
Nozzles/Row:	4	4
Boom Length, Unit:	6 FT	6 FT
Boom Height, Unit:	2 FT	2 FT
Ground Speed, Unit:	2 MPH	2 MPH
Carrier:	WATER	WATER
Spray Volume, Unit:	25 GAL/AC	25 GAL/AC
Mix Size, Unit:	2 L	2 L
Tank Mix (Y/N):	Y yes	Y yes

PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)									
Pest Type	W Weed	W Weed	Green Overall	W Weed	W Weed				
Pest Code	PLALA	FESAR		TRFIN	LOLMU				
Pest Scientific Name	Plantago lancea>	Schedonorus ar>		Trifolium inca>	Lolium multifi>				
Pest Name	Buckhorn plant>	Tall fescue		Carnation clov>	Bearded ryegra>				
Part Rated		PLANT P			PLANT P				
Rating Date	Jan-27-2017	Jan-27-2017	Jan-27-2017	Jan-27-2017	Jan-27-2017				
Rating Type	GROUND	GROUND	GROUND	GROUND	GROUND				
Rating Unit	%	%	%	%	%				
Number of Subsamples	1	1	1	1	1				
Days After First/Last Applic.	57 57	57 57	57 57	57 57	57 57				
Trt-Eval Interval	0 DA-B	0 DA-B	0 DA-B	0 DA-B	0 DA-B				
ARM Action Codes	L05	L05	L05	L05	L05				
Trt No.	Treatment Name	Rate	Appl Unit	7*	8*	9*	10*	11*	
1	UNTREATED CHECK			17.5-	18.0-	66.3-	17.5-	5.0b	
7	PIPER	6oz wt/a	B	18.8-	25.0-	63.8-	10.0-	5.0a	
	COC	1% v/v	B						
8	PIPER	8oz wt/a	B	18.8-	25.0-	68.8-	7.5-	5.0a	
	COC	1% v/v	B						
9	ACCORD XRT	12fl oz/a	B	21.3-	25.0-	65.0-	11.3-	5.0a	
10	PIPER	6oz wt/a	B	21.3-	27.5-	68.8-	12.5-	5.0a	
	ACCORD XRT	12fl oz/a	B						
11	PIPER	6oz wt/a	B	22.5-	26.3-	63.8-	7.5-	5.0a	
	OUST	0.5oz wt/a	B						
	COC	1% v/v	B						
12	OUST	0.5oz wt/a	B	20.0-	25.0-	65.0-	11.3-	5.0a	
	MILESTONE VM	5fl oz/a	B						
	ACCORD XRT	18fl oz/a	B						
LSD P=.05				6.52	11.69	5.27	11.18	.	
Standard Deviation				4.39	7.87	3.55	7.53	0.00	
CV				21.94	32.08	5.39	67.98	0.0	
Levene's F				1.269	0.256	0.739	1.591	0.00	
Levene's Prob(F)				0.313	0.951	0.624	0.199	.	
Skewness				0.0	-1.4302*	-0.3279	1.4893*	.	
Kurtosis				0.061	2.3642*	-1.207	1.1735	.	
Replicate F				6.557	0.197	1.772	2.753	0.000	
Replicate Prob(F)				0.0035	0.8968	0.1886	0.0727	1.0000	
Treatment F				0.649	0.595	1.441	0.825	0.000	
Treatment Prob(F)				0.6902	0.7304	0.2536	0.5655	1.0000	

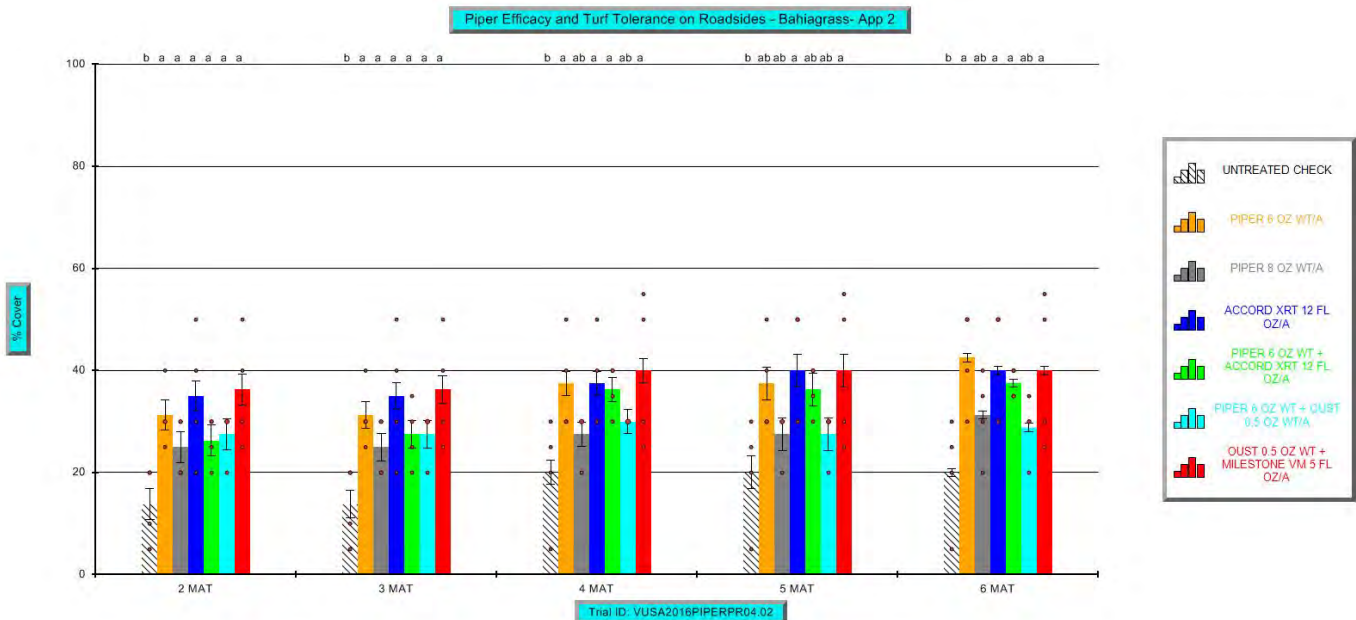
Chart 159. Bahiagrass (*Paspalum notatum*) color (1-9) at 2 and 3 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	Green Overall	W Weed	W Weed
Pest Code	CHPTA	TRFDU		TRFIN	LOLMU
Pest Scientific Name	Chaerophyllum > Hairyfruit che>	Trifolium dubi> Small hop clov>		Trifolium inca> Carnation clov>	Lolium multifl> Bearded ryegra>
Pest Name					PLANT P
Part Rated					
Rating Date	Jan-27-2017	Jan-27-2017	Feb-27-2017	Feb-27-2017	Feb-27-2017
Rating Type	GROUND	GROUND	GROUND	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	57 57	57 57	88 31	88 31	88 31
Trt-Eval Interval	0 DA-B	0 DA-B	31 DA-B	31 DA-B	31 DA-B
ARM Action Codes	L05	L05	L05	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	12*	13*	40*
1UNTREATED CHECK			6.3-	22.5d	68.8a
7PIPER	6oz wt/a B		6.3-	27.5bcd	26.3b
COC	1% v/v B				90.0-
8PIPER	8oz wt/a B		5.0-	35.0a	23.8b
COC	1% v/v B				92.5-
9ACCORD XRT	12fl oz/a B		5.0-	27.5bcd	18.8bc
10PIPER	6oz wt/a B		6.3-	32.5ab	11.3cd
ACCORD XRT	12fl oz/a B				100.0-
11PIPER	6oz wt/a B		5.0-	30.0abc	23.8b
OUST	0.5oz wt/a B				98.8-
COC	1% v/v B				100.0-
12OUST	0.5oz wt/a B		5.0-	25.0cd	8.8d
MILESTONE VM	5fl oz/a B				100.0-
ACCORD XRT	18fl oz/a B				100.0-
LSD P=.05			1.99	6.62	7.77
Standard Deviation			1.34	4.45	5.23
CV			24.14	15.59	20.21
Levene's F			0.667	1.00	0.757
Levene's Prob(F)			0.677	0.451	0.611
Skewness			2.6865*	0.297	1.4683*
Kurtosis			5.6138*	0.0417	1.2968
Replicate F			4.500	22.560	1.685
Replicate Prob(F)			0.0159	0.0001	0.2059
Treatment F			1.000	3.720	58.565
Treatment Prob(F)			0.4552	0.0139	0.0001

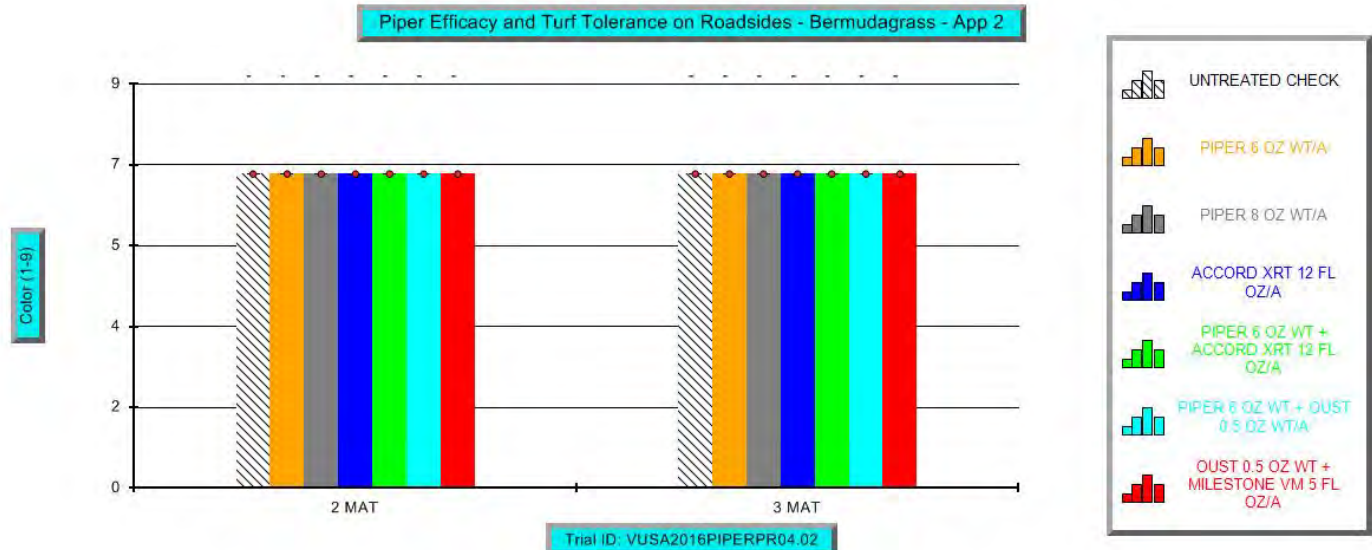
Chart 160. Bahiagrass (*Paspalum notatum*) cover through 6 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	CHPTA	TRFDU	PLALA	FESAR	GERCA
Pest Scientific Name	Chaerophyllum >	Trifolium dubi>	Plantago lance>	Schedonorus ar>	Geranium carol>
Pest Name	Hairyfruit che>	Small hop clov>	Buckhorn plant>	Tall fescue	Carolina geran>
Part Rated				PLANT P	
Rating Date	Feb-27-2017	Feb-27-2017	Feb-27-2017	Feb-27-2017	Feb-27-2017
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	88 31	88 31	88 31	88 31	88 31
Trt-Eval Interval	31 DA-B	31 DA-B	31 DA-B	31 DA-B	31 DA-B
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	43*	44*	45*
1UNTREATED CHECK			0.0	0.0	0.0
7PIPER	6oz wt/a B		75.0c	91.3d	40.0c
COC	1% v/v B				
8PIPER	8oz wt/a B		87.0b	93.8bcd	57.5b
COC	1% v/v B				
9ACCORD XRT	12fl oz/a B		98.3a	93.3cd	55.0bc
10PIPER	6oz wt/a B		100.0a	99.5ab	82.5a
ACCORD XRT	12fl oz/a B				
11PIPER	6oz wt/a B		96.3ab	97.5abc	55.0bc
OUST	0.5oz wt/a B				
COC	1% v/v B				
12OUST	0.5oz wt/a B		100.0a	100.0a	77.5a
MILESTONE VM	5fl oz/a B				
ACCORD XRT	18fl oz/a B				
LSD P=.05			9.35	5.97	17.46
Standard Deviation			6.20	3.96	11.58
CV			6.69	4.13	18.91
Levene's F			1.545	3.876	1.443
Levene's Prob(F)			0.226	0.015*	0.257
Skewness			-1.6073*	-1.4165*	-0.1038
Kurtosis			2.4016*	2.1306*	-0.9867
Replicate F			0.316	2.703	0.528
Replicate Prob(F)			0.8134	0.0826	0.6698
Treatment F			10.310	3.348	7.509
Treatment Prob(F)			0.0002	0.0314	0.0010

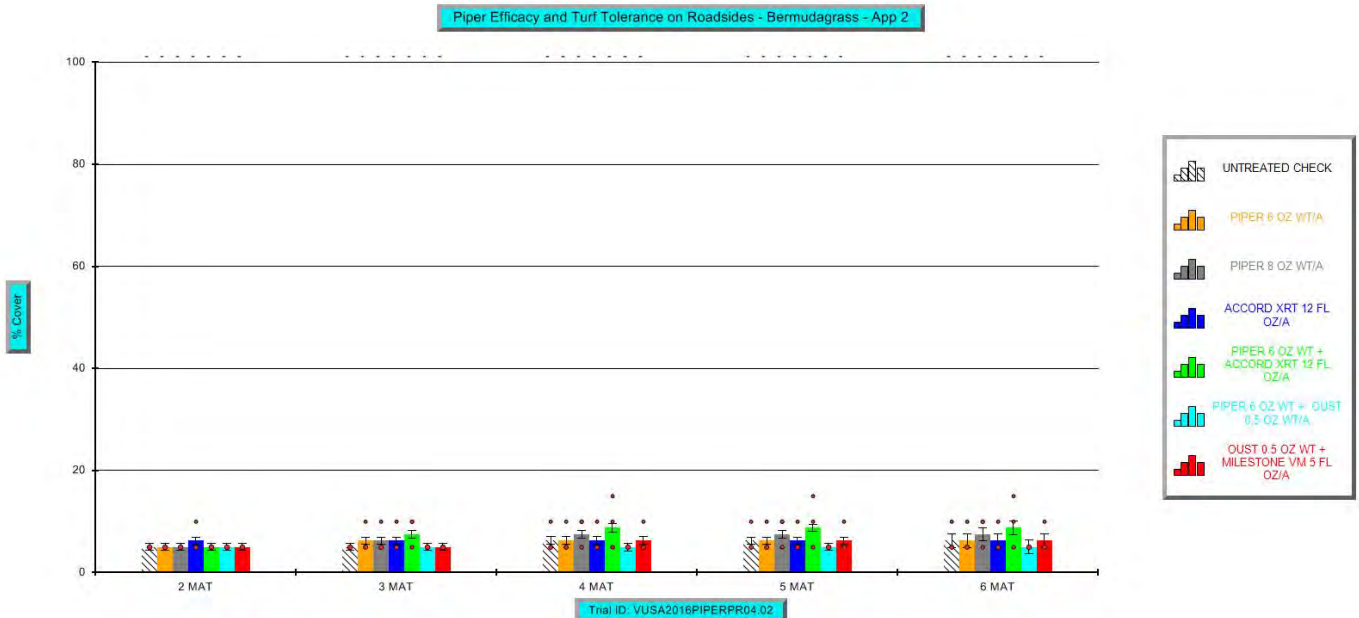
Chart 161. Bermudagrass (*Cynodon dactylon*) color at 2 and 3 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

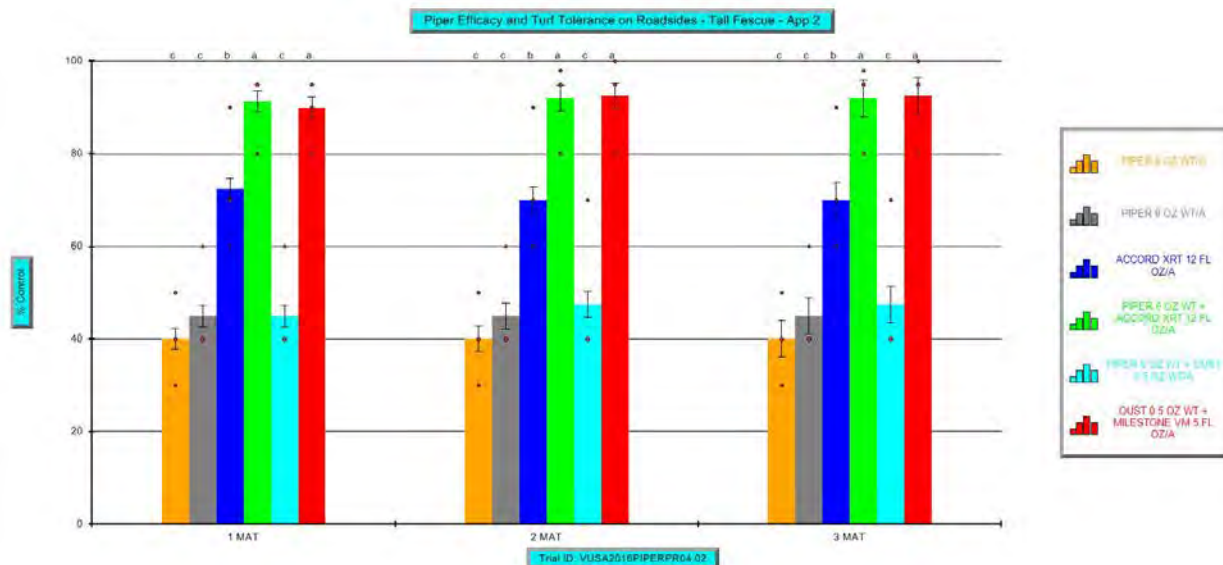
Pest Type		W Weed	W Weed	W Weed	W Weed
Pest Code		TRFIN	LOLMU	CHPTA	TRFDU
Pest Scientific Name	Green Overall	Trifolium inca>	Lolium multifi>	Chaerophyllum >	Trifolium dubi>
Pest Name		Carnation clov>	Bearded ryegra>	Hairyfruit che>	Small hop clov>
Part Rated			PLANT P		
Rating Date	Mar-29-2017	Mar-29-2017	Mar-29-2017	Mar-29-2017	Mar-29-2017
Rating Type	GROUND	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	118 61	118 61	118 61	118 61	118 61
Trt-Eval Interval	61 DA-B	61 DA-B	61 DA-B	61 DA-B	61 DA-B
ARM Action Codes	L05	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	48*	49*	50*
1UNTREATED CHECK			55.0-	0.0	0.0
7PIPER	6oz wt/a B		50.0-	90.0b	99.5-
COC	1% v/v B				72.5c
8PIPER	8oz wt/a B		41.3-	90.0b	100.0-
COC	1% v/v B				86.3b
9ACCORD XRT	12fl oz/a B		45.0-	99.0a	100.0-
10PIPER	6oz wt/a B		30.0-	100.0a	100.0-
ACCORD XRT	12fl oz/a B				100.0a
11PIPER	6oz wt/a B		37.5-	98.8a	100.0-
OUST	0.5oz wt/a B				96.3ab
COC	1% v/v B				99.5a
12OUST	0.5oz wt/a B		35.0-	100.0a	100.0-
MILESTONE VM	5fl oz/a B				100.0a
ACCORD XRT	18fl oz/a B				
LSD P=.05			24.31	8.62	0.62
Standard Deviation			16.36	5.72	0.41
CV			38.99	5.94	0.41
Levene's F			0.748	92.20	1.00
Levene's Prob(F)			0.618	0.001*	0.446
Skewness			0.1203	-1.8267*	-4.899*
Kurtosis			1.1519	1.5798	24.0*
Replicate F			0.528	3.385	1.000
Replicate Prob(F)			0.6687	0.0461	0.4199
Treatment F			1.135	2.936	1.000
Treatment Prob(F)			0.3822	0.0482	0.4509

Chart 162. Bermudagrass (*Cynodon dactylon*) cover through 6 months following herbicide applications on January, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)						
Pest Type	W Weed	W Weed	W Weed			
Pest Code	PLALA	FESAR	GERCA			
Pest Scientific Name	Plantago lance>	Schedonorus ar>	Geranium carol>			
Pest Name	Buckhorn plant>	Tall fescue	Carolina geran>			
Crop Code				PASNO	PASNO	
BBCH Scale				BGRM	BGRM	
Crop Scientific Name				Paspalum notat>	Paspalum notat>	
Crop Name				Water couch	Water couch	
Part Rated		PLANT P		PLANT C	PLANT C	
Rating Date	Mar-29-2017	Mar-29-2017	Mar-29-2017	Mar-29-2017	Mar-29-2017	
Rating Type	CONTRO	CONTRO	CONTRO	COLOR	GROUND	
Rating Unit	%	%	%	1-9	%	
Number of Subsamples	1	1	1	1	1	
Days After First/Last Applic.	118 61	118 61	118 61	118 61	118 61	
Trt-Eval Interval	61 DA-B	61 DA-B	61 DA-B	61 DA-B	61 DA-B	
ARM Action Codes	EC L05E	EC L05E	EC L05E	L05	L05	
Trt Treatment	Rate	Appl				
No. Name	Rate Unit	Code	53*	54*	55*	56*
1UNTREATED CHECK			0.0	0.0	0.0	7.0a
7PIPER	6oz wt/a B		25.0c	40.0c	87.5c	5.5b
COC	1% v/v B					31.3abc
8PIPER	8oz wt/a B		45.0b	45.0c	96.3ab	5.3b
COC	1% v/v B					25.0c
9ACCORD XRT	12fl oz/a B		88.3a	70.0b	90.0bc	5.3b
10PIPER	6oz wt/a B		91.3a	92.0a	100.0a	5.0b
ACCORD XRT	12fl oz/a B					26.3bc
11PIPER	6oz wt/a B		37.5bc	47.5c	98.8a	5.0b
OUST	0.5oz wt/a B					27.5abc
COC	1% v/v B					
12OUST	0.5oz wt/a B		93.8a	92.5a	100.0a	5.3b
MILESTONE VM	5fl oz/a B					36.3a
ACCORD XRT	18fl oz/a B					
LSD P=.05			13.68	17.42	8.26	0.53
Standard Deviation			9.08	11.56	5.48	0.36
CV			14.31	17.92	5.74	6.52
Levene's F			0.40	0.20	5.867	1.333
Levene's Prob(F)			0.842	0.958	0.002*	0.286
Skewness			-0.1312	0.1927	-1.556*	1.291*
Kurtosis			-1.6976	-1.6161	1.3966	0.1816
Replicate F			0.213	0.481	0.139	2.531
Replicate Prob(F)			0.8855	0.7002	0.9352	0.0896
Treatment F			46.567	16.998	3.889	15.375
Treatment Prob(F)			0.0001	0.0001	0.0185	0.0001

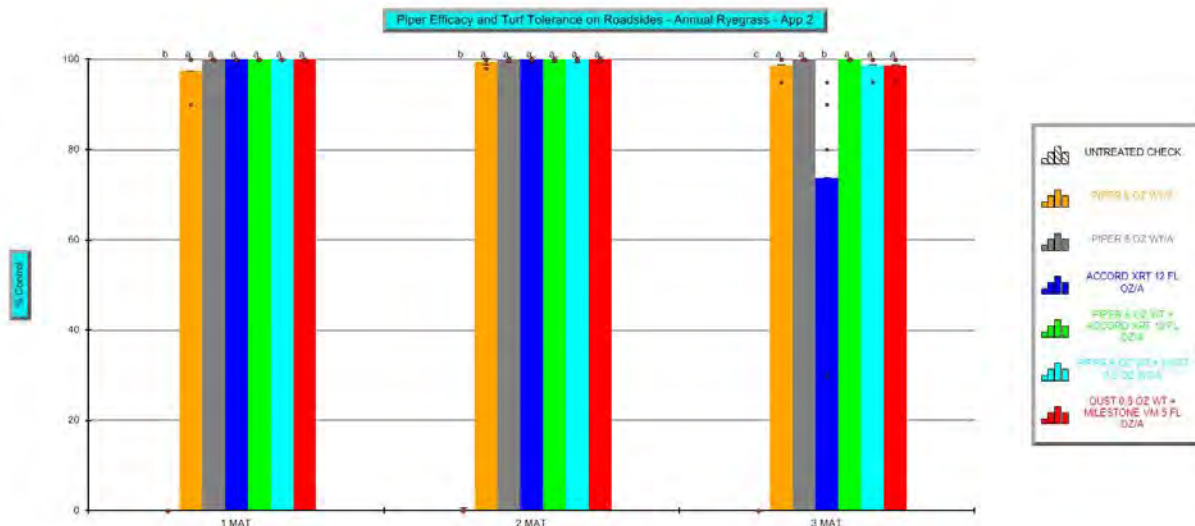
Chart 163. Tall fescue (*Schedonorus arundinaceus*) damage (control) through 3 months following herbicide applications on January, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type					W Weed	W Weed
Pest Code					TRFIN	LOLMU
Pest Scientific Name				Green Overall	Trifolium inca>	Lolium multifi>
Pest Name					Carnation clov>	Bearded ryegra>
Crop Code	CYNDA	CYNDA				
BBCH Scale	BGRM	BGRM				
Crop Scientific Name	Cynodon dactyl>	Cynodon dactyl>				
Crop Name	Common bermuda>	Common bermuda>				
Part Rated	PLANT C	PLANT C				PLANT P
Rating Date	Mar-29-2017	Mar-29-2017	Apr-28-2017	Apr-28-2017	Apr-28-2017	Apr-28-2017
Rating Type	COLOR	GROUND	GROUND	GROUND	CONTRO	CONTRO
Rating Unit	1-9	%	%	%	%	%
Number of Subsamples	1	1	1	1	1	1
Days After First/Last Applic.	118 61	118 61	148 91	148 91	148 91	148 91
Trt-Eval Interval	61 DA-B	61 DA-B	91 DA-B	91 DA-B	91 DA-B	91 DA-B
ARM Action Codes	L05	L05	L05	L05	EC L05E	EC L05E
Trt Treatment	Rate	Appl				
No. Name	Rate Unit Code		58*	59*	72*	73*
1UNTREATED CHECK			7.0-	5.0-	72.5a	0.0
7PIPER	6oz wt/a B		7.0-	5.0-	60.0b	84.5-
COC	1% v/v B					98.8-
8PIPER	8oz wt/a B		7.0-	5.0-	55.0bc	84.5-
COC	1% v/v B					100.0-
9ACCORD XRT	12fl oz/a B		7.0-	6.3-	60.0b	99.0-
10PIPER	6oz wt/a B		7.0-	5.0-	48.8c	95.0-
ACCORD XRT	12fl oz/a B					100.0-
11PIPER	6oz wt/a B		7.0-	5.0-	57.5b	98.8-
OUST	0.5oz wt/a B					98.8-
COC	1% v/v B					
12OUST	0.5oz wt/a B		7.0-	5.0-	60.0b	100.0-
MILESTONE VM	5fl oz/a B					98.8-
ACCORD XRT	18fl oz/a B					
LSD P=.05				1.40	6.89	13.14
Standard Deviation			0.00	0.94	4.64	8.72
CV			0.0	18.25	7.85	9.31
Levene's F			0.00	1.00	2.641	133.267
Levene's Prob(F)				0.451	0.046*	0.001*
Skewness				5.2915*	-0.2837	-1.6757*
Kurtosis				28.0*	0.6992	1.1822
Replicate F			0.000	1.000	5.129	2.938
Replicate Prob(F)			1.0000	0.4155	0.0097	0.0673
Treatment F			0.000	1.000	9.553	2.783
Treatment Prob(F)			1.0000	0.4552	0.0001	0.0568

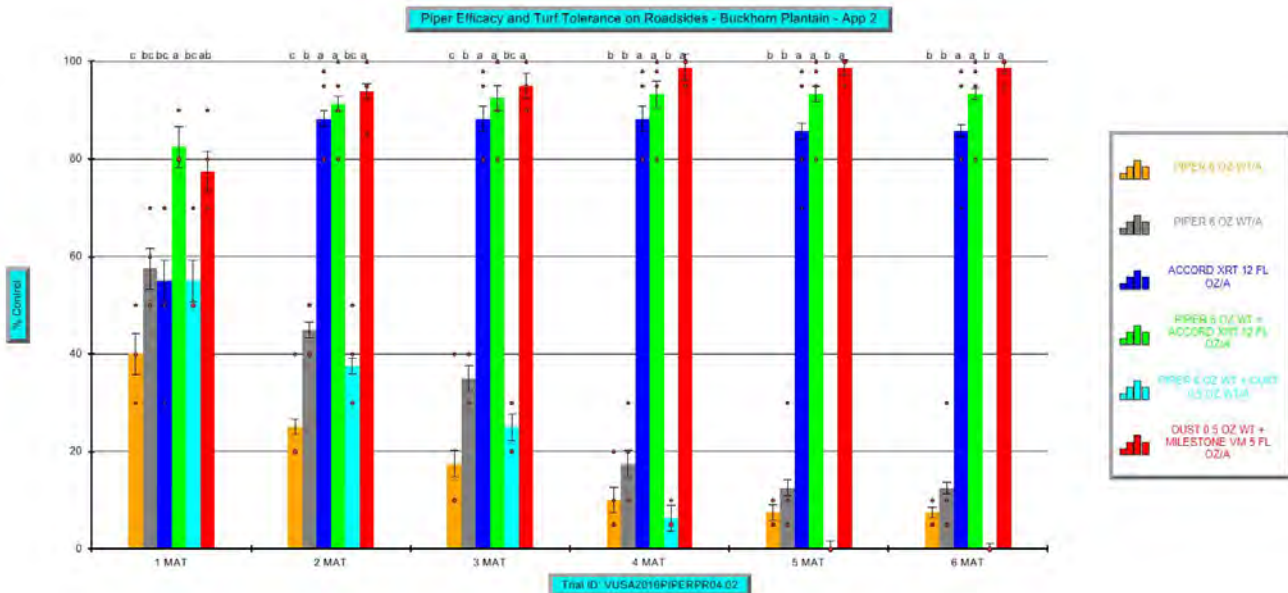
Chart 164. Annual ryegrass (*Lolium multiflorum*) control through 5 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

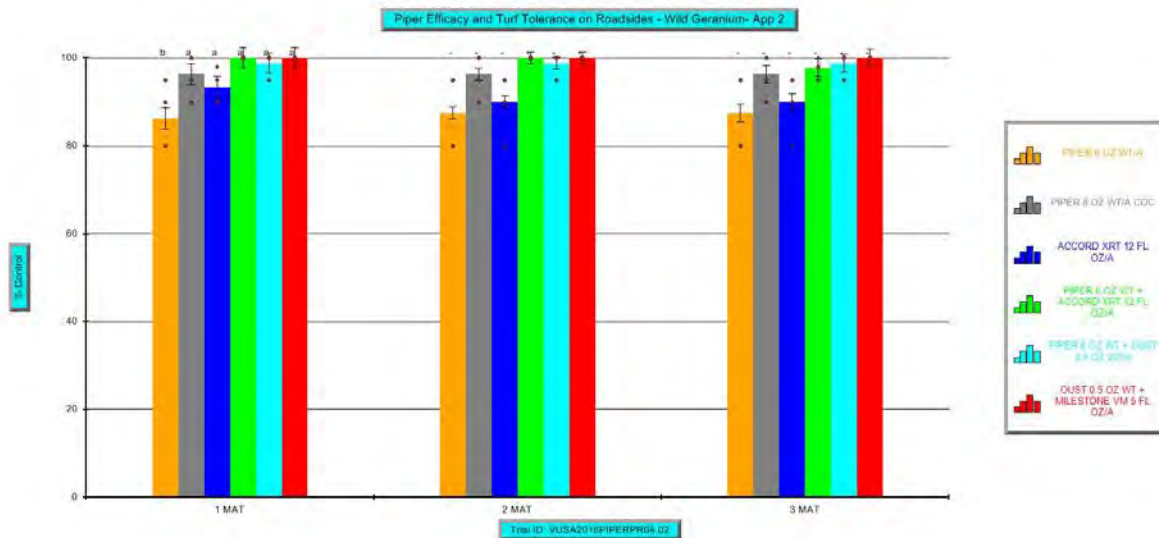
Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	CHPTA	TRFDU	PLALA	FESAR	GERCA
Pest Scientific Name	Chaerophyllum >	Trifolium dubi>	Plantago lance>	Schedonorus ar>	Geranium carol>
Pest Name	Hairyfruit che>	Small hop clov>	Buckhorn plant>	Tall fescue	Carolina geran>
Part Rated				PLANT P	
Rating Date	Apr-28-2017	Apr-28-2017	Apr-28-2017	Apr-28-2017	Apr-28-2017
Rating Type	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	148 91	148 91	148 91	148 91	148 91
Trt-Eval Interval	91 DA-B	91 DA-B	91 DA-B	91 DA-B	91 DA-B
ARM Action Codes	EC L05E	EC L05E	EC L05E	EC L05E	EC L05E
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	75*	76*	77*
1UNTREATED CHECK			0.0	0.0	0.0
7PIPER	6oz wt/a B		65.0b	91.3bc	17.5c
COC	1% v/v B				40.0c
8PIPER	8oz wt/a B		77.5b	95.3ab	35.0b
COC	1% v/v B				45.0c
9ACCORD XRT	12fl oz/a B		98.3a	86.3c	88.3a
10PIPER	6oz wt/a B		100.0a	97.0ab	92.5a
ACCORD XRT	12fl oz/a B				92.0a
11PIPER	6oz wt/a B		96.3a	98.8ab	25.0bc
OUST	0.5oz wt/a B				47.5c
COC	1% v/v B				98.8a
12OUST	0.5oz wt/a B		100.0a	100.0a	95.0a
MILESTONE VM	5fl oz/a B				92.5a
ACCORD XRT	18fl oz/a B				100.0a
LSD P=.05			13.08	8.54	13.94
Standard Deviation			8.68	5.67	9.25
CV			9.69	5.98	15.7
Levene's F			1.752	1.119	0.438
Levene's Prob(F)			0.174	0.385	0.816
Skewness			-1.717*	-2.0534*	-0.0937
Kurtosis			2.9771*	4.8368*	-1.8281
Replicate F			0.582	2.445	0.758
Replicate Prob(F)			0.6362	0.1041	0.5348
Treatment F			11.551	3.324	62.962
Treatment Prob(F)			0.0001	0.0322	0.0001

Chart 165. Buckhorn plantain (*Plantago lanceolata*) control through 6 months following herbicide applications on January 27, 2017.



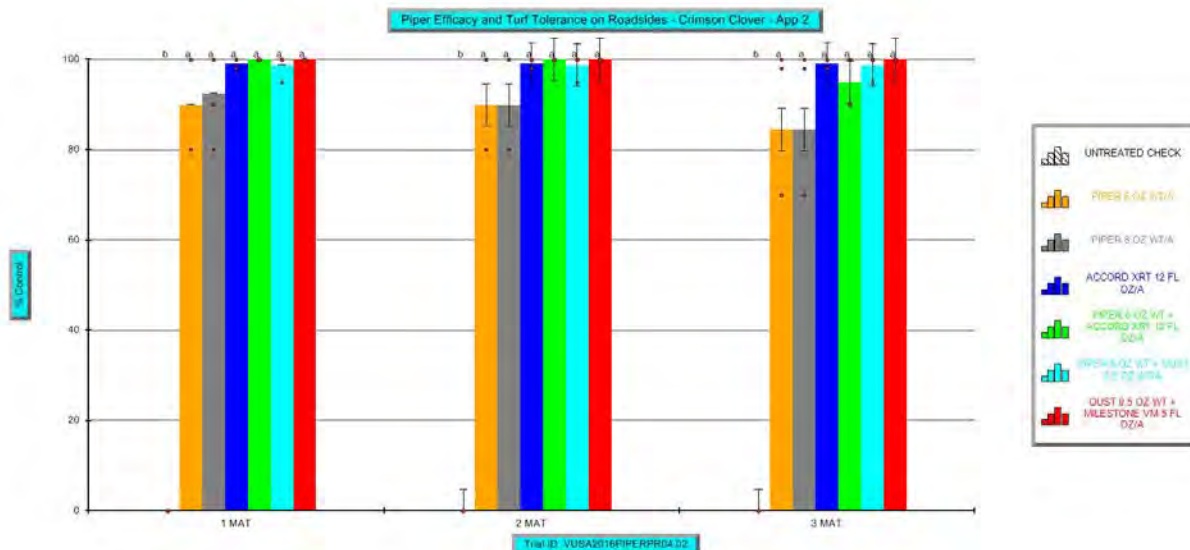
PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)										
Pest Type										W Weed
Pest Code										DIGAD
Pest Scientific Name										Digitaria cili>
Pest Name										Henry crabgrass
Crop Code		PASNO		PASNO		CYNDA		CYNDA		
BBCH Scale		BGRM		BGRM		BGRM		BGRM		
Crop Scientific Name		Paspalum notat>		Paspalum notat>		Cynodon dactyl>		Cynodon dactyl>		
Crop Name		Water couch		Water couch		Common bermuda>		Common bermuda>		
Part Rated		PLANT C		PLANT C		PLANT C		PLANT C		
Rating Date		Apr-28-2017		Apr-28-2017		Apr-28-2017		Apr-28-2017		Apr-28-2017
Rating Type		COLOR		GROUND		COLOR		GROUND		GROUND
Rating Unit		1-9		%		1-9		%		%
Number of Subsamples		1		1		1		1		1
Days After First/Last Applic.		148 91		148 91		148 91		148 91		148 91
Trt-Eval Interval		91 DA-B		91 DA-B		91 DA-B		91 DA-B		91 DA-B
ARM Action Codes		L05		L05		L05		L05		L05
Trt No.	Treatment Name	Rate	Appl Unit	Code	80*	81*	82*	83*	84*	
1	UNTREATED CHECK				7.0a	13.8c	7.0-	5.0-	1.3c	
7	PIPER	6oz wt/a	B		6.3b	31.3ab	7.0-	6.3-	6.3bc	
	COC	1% v/v	B							
8	PIPER	8oz wt/a	B		6.5ab	25.0b	7.0-	6.3-	5.0bc	
	COC	1% v/v	B							
9	ACCORD XRT	12fl oz/a	B		6.5ab	35.0a	7.0-	6.3-	21.3a	
10	PIPER	6oz wt/a	B		6.0b	27.5ab	7.0-	7.5-	10.0b	
	ACCORD XRT	12fl oz/a	B							
11	PIPER	6oz wt/a	B		6.0b	27.5ab	7.0-	5.0-	9.3b	
	OUST	0.5oz wt/a	B							
	COC	1% v/v	B							
12	OUST	0.5oz wt/a	B		6.0b	36.3a	7.0-	5.0-	27.5a	
	MILESTONE VM	5fl oz/a	B							
	ACCORD XRT	18fl oz/a	B							
LSD P=.05					0.63	9.33	.	2.96	7.42	
Standard Deviation					0.42	6.28	0.00	1.99	4.99	
CV					6.68	22.41	0.0	33.8	43.43	
Levene's F					3.00	1.684	0.00	1.333	2.269	
Levene's Prob(F)					0.028*	0.174	.	0.286	0.076	
Skewness					0.0612	0.1848	.	1.7751*	1.1195*	
Kurtosis					-0.6187	0.6576	.	1.2339	0.5064	
Replicate F					2.867	6.294	0.000	0.825	5.599	
Replicate Prob(F)					0.0654	0.0041	1.0000	0.4971	0.0068	
Treatment F					3.133	5.744	0.000	0.900	14.252	
Treatment Prob(F)					0.0278	0.0017	1.0000	0.5161	0.0001	

Chart 166. Carolina geranium (*Geranium carolinianum*) control through 3 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)									
Pest Type	W Weed		Green Overall		W Weed				
Pest Code	SETGP				PLALA				
Pest Scientific Name	Setaria genicu>				Plantago lance>				
Pest Name	Slender pigeon>				Buckhorn plant>				
Crop Code							PASNO		CYNDA
BBCH Scale							BGRM		BGRM
Crop Scientific Name							Paspalum notat>		Cynodon dactyl>
Crop Name							Water couch		Common bermuda>
Part Rated							PLANT C		PLANT C
Rating Date	Apr-28-2017		May-30-2017		May-30-2017		May-30-2017		May-30-2017
Rating Type	GROUND		GROUND		CONTRO		GROUND		GROUND
Rating Unit	%		%		%		%		%
Number of Subsamples	1		1		1		1		1
Days After First/Last Applic.	148 91		180 123		180 123		180 123		180 123
Trt-Eval Interval	91 DA-B		123 DA-B		123 DA-B		123 DA-B		123 DA-B
ARM Action Codes	L05		L05		EC L05E		L05		L05
Trt Treatment	Rate	Appl							
No. Name	Rate Unit	Code	85*	109*	110*	111*	112*		
1UNTREATED CHECK			1.3c	73.8a	0.0	20.0c		6.3-	
7PIPER	6oz wt/a B		5.0bc	62.5b	10.0cd	37.5ab		6.3-	
COC	1% v/v B								
8PIPER	8oz wt/a B		2.5bc	60.0b	17.5c	27.5bc		7.5-	
COC	1% v/v B								
9ACCORD XRT	12fl oz/a B		8.8b	71.3a	88.3b	37.5ab		6.3-	
10PIPER	6oz wt/a B		6.3bc	63.8b	93.3ab	36.3ab		8.8-	
ACCORD XRT	12fl oz/a B								
11PIPER	6oz wt/a B		7.5bc	61.3b	6.3d	30.0abc		5.0-	
OUST	0.5oz wt/a B								
COC	1% v/v B								
12OUST	0.5oz wt/a B		16.3a	71.3a	98.8a	40.0a		6.3-	
MILESTONE VM	5fl oz/a B								
ACCORD XRT	18fl oz/a B								
LSD P=.05			7.37	5.71	9.72	11.06		4.11	
Standard Deviation			4.96	3.84	6.45	7.45		2.76	
CV			73.1	5.8	12.32	22.79		41.83	
Levene's F			0.708	2.565	1.86	3.418		1.267	
Levene's Prob(F)			0.647	0.051	0.152	0.016*		0.314	
Skewness			0.9725*	0.2689	0.0047	0.0047		1.5157*	
Kurtosis			0.1321	-0.9382	-2.0548*	1.2748		1.5807	
Replicate F			1.790	2.315	2.905	4.181		1.364	
Replicate Prob(F)			0.1851	0.1102	0.0692	0.0207		0.2857	
Treatment F			3.968	8.597	197.179	3.698		0.740	
Treatment Prob(F)			0.0105	0.0002	0.0001	0.0143		0.6243	

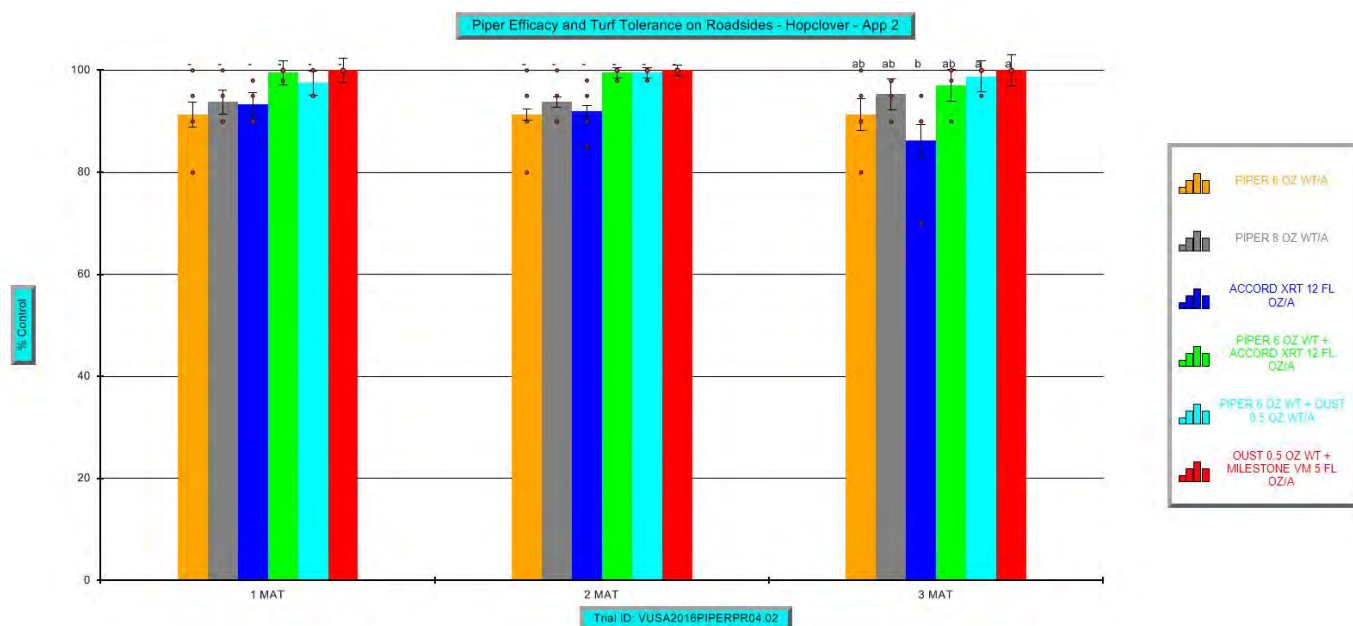
Chart 167. Crimson clover (*Trifolium incarnatum*) control through 3 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

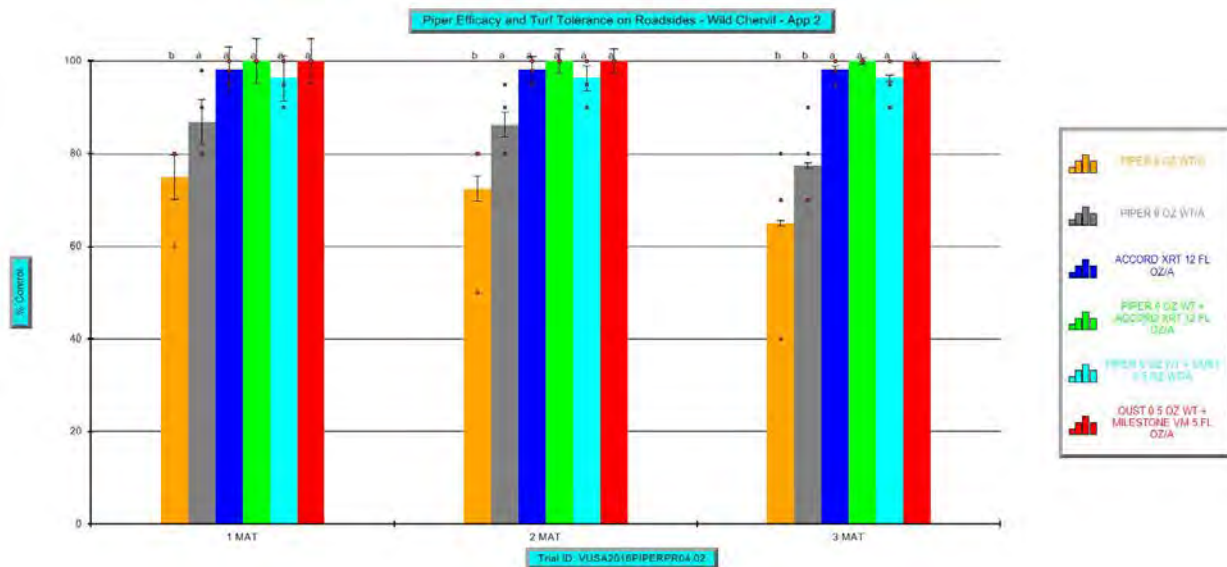
	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Type	DIGAD	SETGP	PLAAR	GALMO	ERIST
Pest Code	Digitaria cili>	Setaria genicu>	Plantago arist>	Galium mollugo	Erigeron annuu>
Pest Scientific Name	Henry crabgrass	Slender pigeon>	Bracted planta>	Smooth bedstraw	Rough fleabane
Pest Name	May-30-2017	May-30-2017	May-30-2017	May-30-2017	May-30-2017
Rating Date	GROUND	GROUND	GROUND	GROUND	GROUND
Rating Type	%	%	%	%	%
Rating Unit	1	1	1	1	1
Number of Subsamples	180 123	180 123	180 123	180 123	180 123
Days After First/Last Applic.	123 DA-B	123 DA-B	123 DA-B	123 DA-B	123 DA-B
Trt-Eval Interval	L05	L05	L05	L05	L05
ARM Action Codes					
Trt Treatment	Rate	Appl			
No. Name	Rate Unit	Code	113*	114*	115*
1UNTREATED CHECK			1.3d	1.3c	8.8a
7PIPER	6oz wt/a B		6.3d	5.0bc	1.0b
COC	1% v/v B				0.0c
8PIPER	8oz wt/a B		7.5d	5.0bc	1.0b
COC	1% v/v B				0.3c
9ACCORD XRT	12fl oz/a B		26.3ab	10.0ab	1.5b
10PIPER	6oz wt/a B		18.8bc	7.5bc	0.3b
ACCORD XRT	12fl oz/a B				10.5a
11PIPER	6oz wt/a B		10.0cd	6.3bc	1.3b
OUST	0.5oz wt/a B				0.0c
COC	1% v/v B				
12OUST	0.5oz wt/a B		32.5a	16.3a	1.8b
MILESTONE VM	5fl oz/a B				0.8c
ACCORD XRT	18fl oz/a B				
LSD P=.05	10.38	6.81	2.15	3.15	9.65
Standard Deviation	6.99	4.59	1.45	2.12	6.49
CV	47.71	62.64	65.49	76.02	150.25
Levene's F	4.577	0.981	0.844	3.173	1.327
Levene's Prob(F)	0.004*	0.462	0.551	0.022*	0.289
Skewness	1.1933*	1.0403*	1.9371*	1.4727*	1.7722*
Kurtosis	0.9942	0.1966	2.826*	1.015	2.0877*
Replicate F	3.390	2.420	0.974	2.920	1.553
Replicate Prob(F)	0.0407	0.0996	0.4269	0.0622	0.2354
Treatment F	10.829	4.302	16.223	14.671	1.822
Treatment Prob(F)	0.0001	0.0073	0.0001	0.0001	0.1512

Chart 168. Little hop clover (*Trifolium dubium*) control through 3 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)									
Pest Type				W Weed					W Weed
Pest Code				PLALA					DIGAD
Pest Scientific Name		Green Overall		Plantago lance>					Digitaria cili>
Pest Name				Buckhorn plant>					Henry crabgrass
Crop Code						CYNDA		PASNO	
BBCH Scale						BGRM		BGRM	
Crop Scientific Name						Cynodon dactyl>		Paspalum notat>	
Crop Name						Common bermuda>		Water couch	
Part Rated						PLANT C		PLANT C	
Rating Date		Jun-27-2017		Jun-27-2017		Jun-27-2017		Jun-27-2017	Jun-27-2017
Rating Type		GROUND		CONTRO		GROUND		GROUND	GROUND
Rating Unit		%		%		%		%	%
Number of Subsamples		1		1		1		1	1
Days After First/Last Applic.		208 151		208 151		208 151		208 151	208 151
Trt-Eval Interval		151 DA-B		151 DA-B		151 DA-B		151 DA-B	151 DA-B
ARM Action Codes		L05		EC L05E		L05		L05	L05
Trt Treatment	Rate	Appl							
No. Name	Rate Unit	Code	118*	119*	120*	121*	122*		
1UNTREATED CHECK			73.8a	0.0	6.3-	20.0c	7.5c		
7PIPER	6oz wt/a B		65.0b	7.5cd	6.3-	37.5ab	8.8c		
COC	1% v/v B								
8PIPER	8oz wt/a B		63.8b	12.5c	7.5-	27.5bc	8.8c		
COC	1% v/v B								
9ACCORD XRT	12fl oz/a B		77.5a	85.8b	6.3-	40.0a	32.5a		
10PIPER	6oz wt/a B		70.0ab	93.3ab	8.8-	36.3ab	20.0b		
ACCORD XRT	12fl oz/a B								
11PIPER	6oz wt/a B		70.0ab	0.0d	5.0-	27.5bc	11.8bc		
OUST	0.5oz wt/a B								
COC	1% v/v B								
12OUST	0.5oz wt/a B		73.8a	98.8a	6.3-	40.0a	35.0a		
MILESTONE VM	5fl oz/a B								
ACCORD XRT	18fl oz/a B								
LSD P=.05			7.89	10.79	4.11	12.19	10.07		
Standard Deviation			5.31	7.16	2.76	8.21	6.78		
CV			7.53	14.42	41.83	25.12	38.2		
Levene's F			1.366	2.24	1.267	3.00	2.625		
Levene's Prob(F)			0.274	0.095	0.314	0.028*	0.047*		
Skewness			-0.2044	0.0232	1.5157*	0.1351	1.2548*		
Kurtosis			-1.2333	-2.0488*	1.5807	0.5702	1.0148		
Replicate F			2.651	3.018	1.364	3.371	5.124		
Replicate Prob(F)			0.0799	0.0628	0.2857	0.0414	0.0098		
Treatment F			3.465	175.471	0.740	3.539	11.937		
Treatment Prob(F)			0.0187	0.0001	0.6243	0.0172	0.0001		

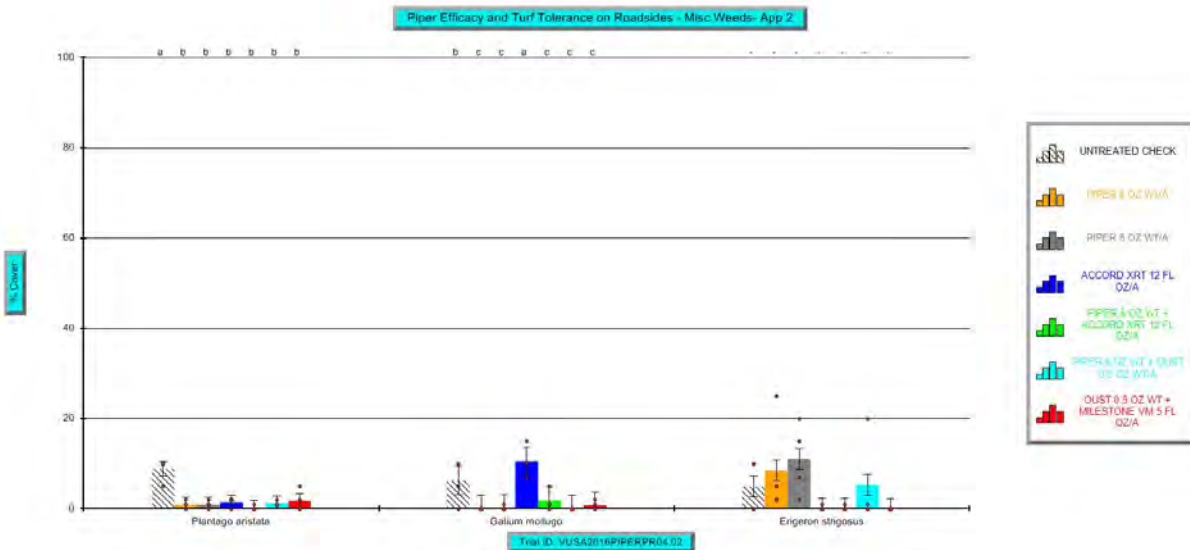
Chart 169. Wild chervil (*Chaerophyllum tainturieri*) control through 3 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

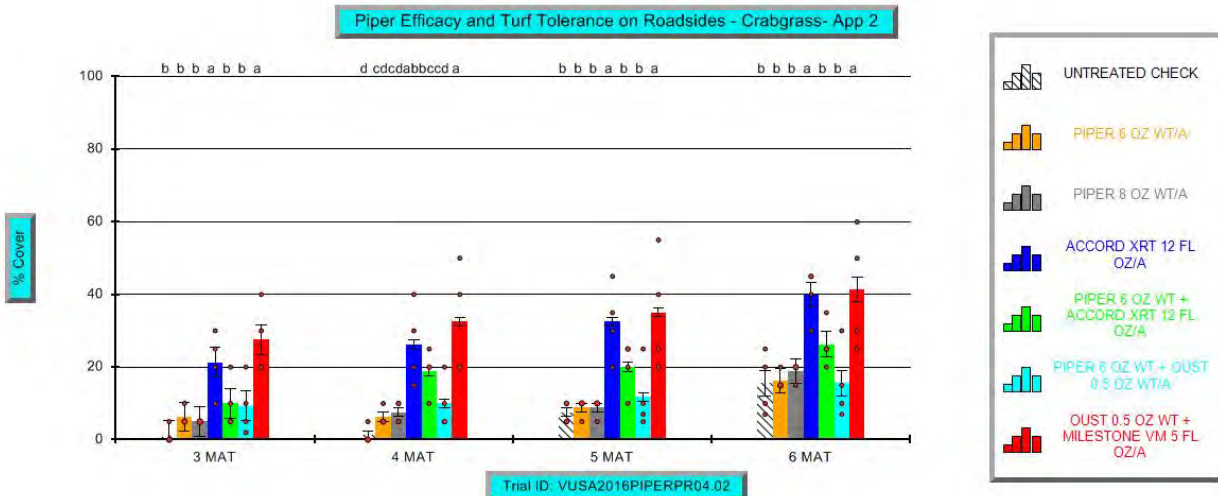
Pest Type	W Weed	W Weed	Green Overall	W Weed	
Pest Code	SETGP	PLAAR		PLALA	
Pest Scientific Name	Setaria genicu>	Plantago arist>		Plantago lance>	
Pest Name	Slender pigeon>	Bracted planta>		Buckhorn plant>	
Crop Code					CYNDA
BBCH Scale					BGRM
Crop Scientific Name					Cynodon dactyl>
Crop Name					Common bermuda>
Part Rated					PLANT C
Rating Date	Jun-27-2017	Jun-27-2017	Jul-27-2017	Jul-27-2017	Jul-27-2017
Rating Type	GROUND	GROUND	GROUND	CONTRO	GROUND
Rating Unit	%	%	%	%	%
Number of Subsamples	1	1	1	1	1
Days After First/Last Applic.	208 151	208 151	238 181	238 181	238 181
Trt-Eval Interval	151 DA-B	151 DA-B	181 DA-B	181 DA-B	181 DA-B
ARM Action Codes	L05	L05	L05	EC L05E	L05
Trt Treatment	Rate	Appl			
No. Name	Rate Unit Code		123*	124*	125*
1UNTREATED CHECK			3.8d	8.8a	76.3bc
7PIPER	6oz wt/a B		6.3cd	1.0b	71.3c
COC	1% v/v B				7.5cd
8PIPER	8oz wt/a B		6.3cd	1.0b	73.8c
COC	1% v/v B				12.5c
9ACCORD XRT	12fl oz/a B		12.5bc	1.5b	86.3a
10PIPER	6oz wt/a B		13.8b	0.3b	73.8c
ACCORD XRT	12fl oz/a B				93.3ab
11PIPER	6oz wt/a B		10.5bcd	1.3b	70.0c
OUST	0.5oz wt/a B				0.0d
COC	1% v/v B				
12OUST	0.5oz wt/a B		23.8a	1.8b	82.5ab
MILESTONE VM	5fl oz/a B				98.8a
ACCORD XRT	18fl oz/a B				
LSD P=.05			7.46	2.15	7.84
Standard Deviation			5.02	1.45	5.28
CV			45.79	65.49	6.92
Levene's F			0.831	0.844	1.769
Levene's Prob(F)			0.559	0.551	0.154
Skewness			0.7277	1.9371*	-0.2076
Kurtosis			-0.2893	2.826*	-0.7039
Replicate F			3.282	0.974	4.388
Replicate Prob(F)			0.0448	0.4269	0.0174
Treatment F			7.150	16.223	5.157
Treatment Prob(F)			0.0005	0.0001	0.0030
					10.79
					7.16
					14.42
					2.24
					0.095
					1.5157*
					2.0488*
					3.018
					0.0628
					0.740
					0.0001
					0.6243

Chart 170. Daisy fleabane (*Erigeron strigosus*), smooth bedstraw (*Galium mollugo*), and bracted plantain (*Plantago aristata*) cover at 6 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)				
Pest Type		W Weed	W Weed	W Weed
Pest Code		DIGAD	SETGP	LESST
Pest Scientific Name		Digitaria cili>	Setaria genicu>	Kummerowia str>
Pest Name		Henry crabgrass	Slender pigeon>	Common lespede>
Crop Code	PASNO			
BBCH Scale	BGRM			
Crop Scientific Name	Paspalum notat>			
Crop Name	Water couch			
Part Rated	PLANT C			
Rating Date	Jul-27-2017	Jul-27-2017	Jul-27-2017	Jul-27-2017
Rating Type	GROUND	GROUND	GROUND	GROUND
Rating Unit	%	%	%	%
Number of Subsamples	1	1	1	1
Days After First/Last Applic.	238 181	238 181	238 181	238 181
Trt-Eval Interval	181 DA-B	181 DA-B	181 DA-B	181 DA-B
ARM Action Codes	L05	L05	L05	L05
Trt No.	Treatment	Rate	Appl	
	Name	Rate Unit	Code	
1	UNTREATED CHECK			128*
7	PIPER	6oz wt/a B		129*
	COC	1% v/v B		130*
8	PIPER	8oz wt/a B		131*
	COC	1% v/v B		
9	ACCORD XRT	12fl oz/a B		
10	PIPER	6oz wt/a B		
	ACCORD XRT	12fl oz/a B		
11	PIPER	6oz wt/a B		
	OUST	0.5oz wt/a B		
	COC	1% v/v B		
12	OUST	0.5oz wt/a B		
	MILESTONE VM	5fl oz/a B		
	ACCORD XRT	18fl oz/a B		
LSD P=.05		12.35	10.84	12.42
Standard Deviation		8.32	7.30	8.36
CV		24.25	29.44	44.68
Levene's F		2.565	3.723	0.96
Levene's Prob(F)		0.051	0.011*	0.475
Skewness		-0.1839	0.9798*	0.9222*
Kurtosis		0.2329	0.5747	0.1942
Replicate F		3.822	4.337	3.626
Replicate Prob(F)		0.0280	0.0182	0.0331
Treatment F		3.732	9.848	4.705
Treatment Prob(F)		0.0137	0.0001	0.0048

Chart 171. Southern crabgrass (*Digitaria ciliaris*) cover through 6 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Pest Type

W, Weed, G-BYRW7, G-WedStg = Weed or volunteer crop

Pest Code

- PLALA, *Plantago lanceolata*, Buckhorn plantain = US
- FESAR, *Schedonorus arundinaceus*, Tall fescue = US
- TRFIN, *Trifolium incarnatum*, Carnation clover = US
- LOLMU, *Lolium multiflorum*, Bearded ryegrass = US
- CHPTA, *Chaerophyllum tainturieri*, Hairyfruit chervil (wild chervil) = US
- TRFDU, *Trifolium dubium*, Small hop clover = US
- GERCA, *Geranium carolinianum*, Carolina geranium = US
- DIGAD, *Digitaria ciliaris*, Henry (southern) crabgrass = US
- SETGP, *Setaria geniculata pauciseta*, Slender pigeongrass (knotroot foxtail) = US; Syn. *Setaria parviflora*
- PLAAR, *Plantago aristata*, Bracted plantain = US
- GALMO, *Galium mollugo*, Smooth bedstraw = US
- ERIST, *Erigeron annuus strigosus*, Rough (daisy) fleabane = US
- LESST, *Kummerowia striata*, Common lespedeza = US; Syn. *Lespedeza striata*

Crop Code

- CYNDA, BGRM, *Cynodon dactylon*, Common bermudagrass = US
- PASNO, BGRM, *Paspalum notatum*, Water couch (bahiagrass) = US

Part Rated

PLANT = plant; P = Pest is Part Rated; C = Crop is Part Rated

Rating Type

GROUND = groundcover; CONTRO = control / burndown or knockdown; COLOR = color

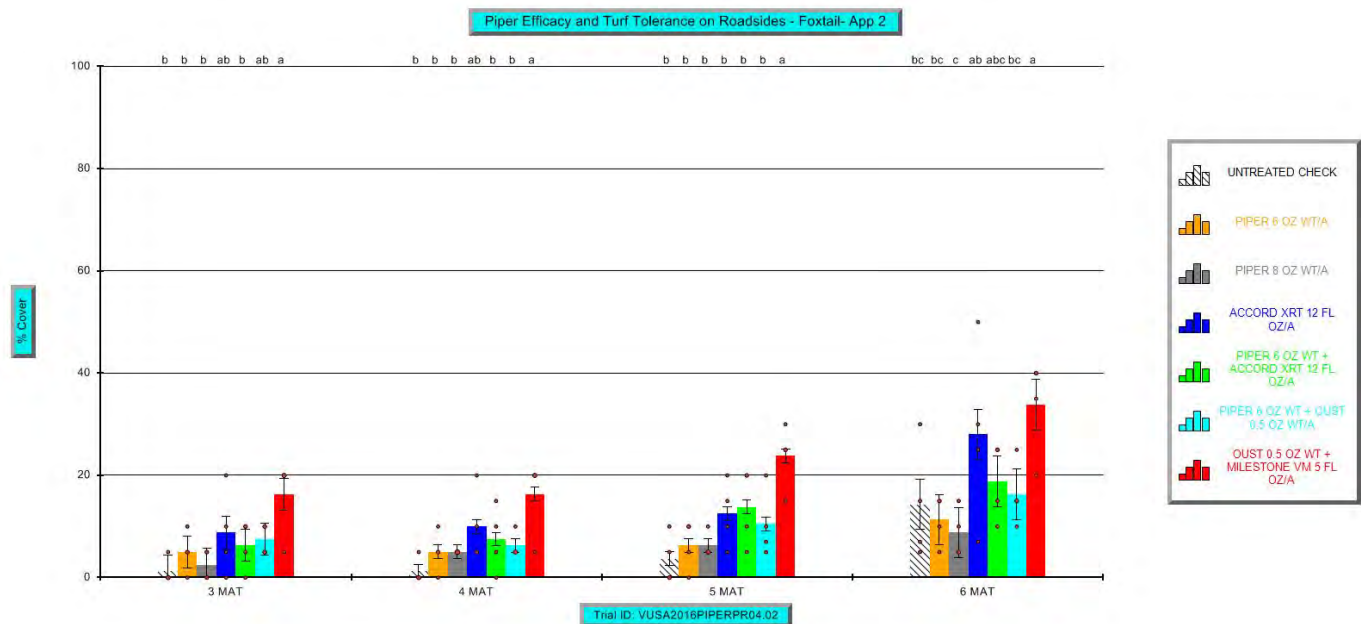
Rating Unit

% = percent; 1-9 = 1-9 index/scale

ARM Action Codes

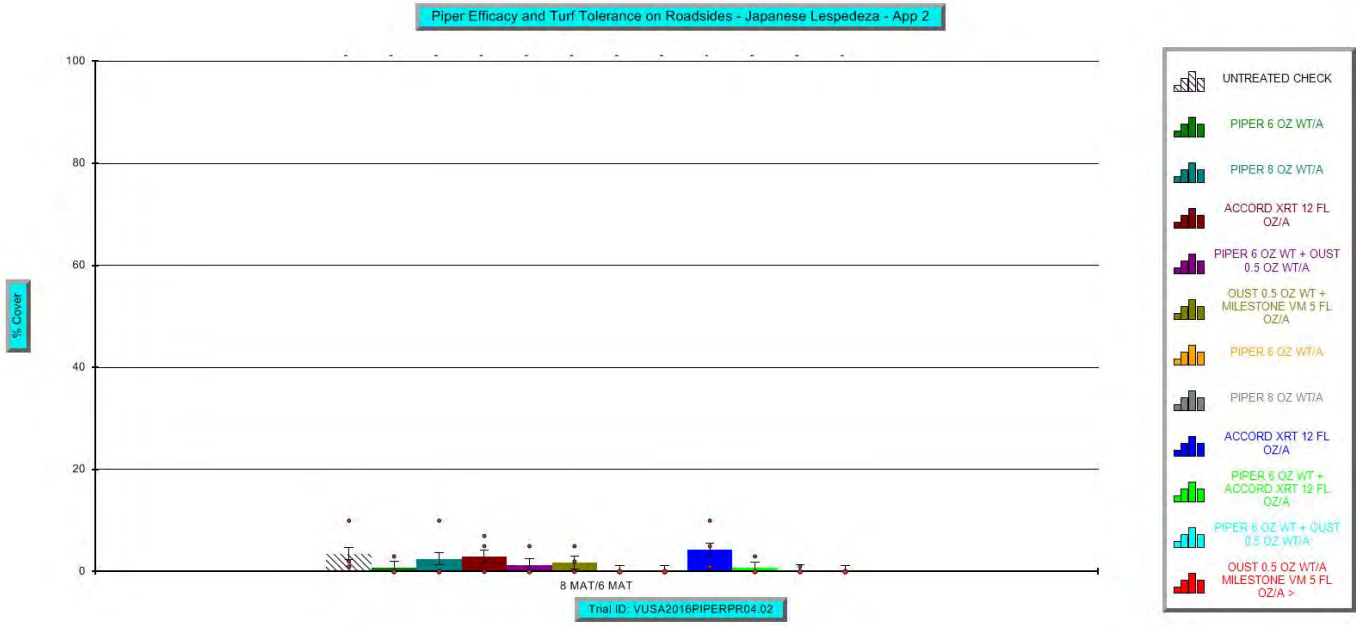
- L05 = Perform 5% Least Significant Difference mean separation on Standardized Summary
- EC = Do not analyze untreated check, while still reporting treatment mean on AOV Means Table
- L05E = Perform 5% Least Significant Difference mean separation on Standardized Summary, and exclude untreated treatments from AOV

Chart 172. Knotroot foxtail (*Setaria parviflora*) cover through 6 months following herbicide applications on January 27, 2017.



PIPER EFFICACY AND TURF TOLERANCE IN UNIMPROVED ROADSIDE TURF (Continued)

Chart 173. Japanese lespedeza (*Kummerowia striata*) cover through 8 months after first application (A) (December 1, 2016) and 6 months following second application (B) (January 27, 2017).



Appendix II

Herbicides used in these studies.

2,4-D	Milestone VM
Accord	MSMA
Accord XRT	Nicosulfuron
Accord XRT II	Opensight
Arsenal	Oust
Arsenal Powerline	Oust XP
Capstone	Payload
Derigo	Perspective
DPX MAT28 (now Method 240SL)	Piper
Escort	Plateau
Esplanade	Pramitol
Esplanade EZ	Prodeuce
Finale	Prodiamine
Garlon 3A	Pronto Vegetation Killer
Garlon 4	Razor Pro
Glyphomax XRT	SMF-75
Glyphomax XRT (salt)	Streamline
Glyphosate 41	Telar
Hyvar X	Triclopyr HL
Knock-Out	Vastlan
Krovar I	Velpar DF
Matrix	Viewpoint
Method 240SL	Vista XRT
Milestone	

Herbicides used in studies reported in this document.

Tradename	Active ingredient	Concentration (%)
	2,4-D amine	46.8
Accord	Isopropylamine salt of glyphosate	41.5
Accord XRT	Isopropylamine salt of glyphosate	53.6
Accord XRTII	Dimethylamine salt of glyphosate	50.2
Arsenal	Isopropylamine salt of imazapyr	27.8
Arsenal Powerline	Isopropylamine salt of imazapyr	26.7
Capstone	Triisopropanolammonium salt of aminopyralid + Triethylamine salt of triclopyr	2.2 + 16.2
Derigo	Foramsulfuron + Iodosulfuron-methyl + Thiencarbazone-methyl	24 + 2.4 + 10.0
DPX MAT-28 (now Method)	Potassium salt of aminocyclopyrachlor	25
Escort	Metsulfuron-methyl	60
Esplanade	Indaziflam	19.5
Esplanade EZ	Indaziflam + Diquat dibromide + Isopropylamine salt of glyphosate	0.089 + 0.89 + 20.5
Finale	Glufosinate ammonium	11.3
Garlon 3A	Trimethylamine salt of triclopyr	44.4
Garlon 4	Butoxyethyl ester of triclopyr	61.6
Glyphomax XRT Glyphomax XRT (salt)	Isopropylamine salt of glyphosate	53.6
Glyphosate 41	Isopropylamine salt of glyphosate	41.0
Hyvar X	Bromacil	80.0
Knock-Out II	Bromacil + 2,4-D	0.98 + 1.1
Krovar I	Bromacil + Diuron	40.0 + 40.0
Matrix	Rimsulfuron	25.0
Method 240SL	Potassium salt of aminocyclopyrachlor	25.0
Milestone or Milestone VM	Triisopropanolammonium salt of aminopyralid	40.6
MSMA	Monosodium acid metharsenate	47.6
	Nicosulfuron	75.0
Opensight	Potassium salt of aminopyralid + Metsulfuron-methyl	62.1 + 9.5
Oust or Oust XP	Sulfosulfuron-methyl	75.0
Payload	Flumioxazin	51.0
Perspective	Aminocyclopyrachlor + Chlorsulfuron	39.5 + 15.8
Piper	Flumioxazin + Pyroxasulfone	33.5 + 42.5
Plateau	Ammonium salt of imazapic	23.6
Pramitol	Prometon	25.0

Tradename	Active Ingredient	Concentration (%)
Prodeuce	Isopropylamine salt of glyphosate + Prodiamine	40.2 + 7.5
	Prodiamine	65.0
Pronto Vegetation Killer	Isopropylamine salt of imazapyr + Isopropylamine salt of glyphosate	1.74 + 3.82
Razor Pro	Isopropylamine salt of glyphosate	41.0
SMF-75	Sulfometuron-methyl	75.0
Streamline	Aminocyclopyrachlor + Metsulfuron-methyl	39.5 + 12.6
Telar	Chlorsulfuron	75.0
Vastlan or Triclopyr HL	Choline salt of triclopyr	54.7
Velpar DF	Hexazinone	75.0
Viewpoint	Imazapyr + Aminocyclopyrachlor + Metsulfuron-methyl	31.6 + 22.8 + 7.3
Vista XRT	Methyl-heptyl ester of fluroxypyr	45.5

Appendix

Plant Species That Can Be Found in This Report

Scientific Name (s)	Common Name(s)	Reference Websites*
<i>Acalypha ostryifolia</i>	hophornbeam copperleaf	https://plants.usda.gov/core/profile?symbol=ACOS http://southeasternflora.com/view_flora.php?plantid=1348
<i>Acer negunda</i>	box-elder	https://plants.usda.gov/core/profile?symbol=ACNE2 http://southeasternflora.com/view_flora.php?plantid=333
<i>Andropogon virginicus</i>	broomsedge	https://plants.usda.gov/core/profile?symbol=ANVI2 http://southeasternflora.com/view_flora.php?plantid=530
<i>Apocynum cannabinum</i>	hemp dogbane	https://plants.usda.gov/core/profile?symbol=APCA http://southeasternflora.com/view_flora.php?plantid=403
<i>Axonopus fissifolius</i> (Syn. <i>Axonopus affinis</i>)	common or narrowleaf carpetgrass	https://plants.usda.gov/core/profile?symbol=AXFI http://southeasternflora.com/view_flora.php?plantid=2505
<i>Bromus inermis</i>	smooth brome	https://plants.usda.gov/core/profile?symbol=BRIN2 http://southeasternflora.com/view_flora.php?plantid=2276
<i>Bromus tectorum</i>	cheatgrass or downy brome	https://plants.usda.gov/core/profile?symbol=BRTE http://southeasternflora.com/view_flora.php?plantid=2467
<i>Campsis radicans</i>	trumpet creeper	https://plants.usda.gov/core/profile?symbol=CARA2 http://southeasternflora.com/view_flora.php?plantid=17
<i>Carex cherokeensis</i>	Cherokee sedge	https://plants.usda.gov/core/profile?symbol=CACH3 http://southeasternflora.com/view_flora.php?plantid=1585
<i>Carya illinoensis</i>	pecan	https://plants.usda.gov/core/profile?symbol=CAIL2 http://southeasternflora.com/view_flora.php?plantid=2522
<i>Chaerophyllum tainturieri</i>	hairyfruit or wild chervil	https://plants.usda.gov/core/profile?symbol=CHATAT http://southeasternflora.com/view_flora.php?plantid=1203
<i>Chamaesyce nutans</i>	nodding spurge	https://plants.usda.gov/core/profile?symbol=CHNU9 http://southeasternflora.com/view_flora.php?plantid=387
<i>Chamaesyce prostrata</i>	ground or prostrate spurge	https://plants.usda.gov/core/profile?symbol=CHPR6
<i>Conyza canadensis</i> (Syn. <i>Erigeron canadensis</i>)	Canada horseweed or marestail	https://plants.usda.gov/core/profile?symbol=COCA5 http://southeasternflora.com/view_flora.php?plantid=929

Appendix (Continued)

Plant Species That Can Be Found in This Report

Scientific Name (s)	Common Name(s)	Reference Websites*
<i>Cornus drummondii</i>	roughleaf dogwood	https://plants.usda.gov/core/profile?symbol=CODR http://southeasternflora.com/view_flora.php?plantid=965
<i>Cynodon dactylon</i>	common bermudagrass	https://plants.usda.gov/core/profile?symbol=CYDA http://southeasternflora.com/view_flora.php?plantid=2386
<i>Cyperus rotundus</i>	purple nutsedge	https://plants.usda.gov/core/profile?symbol=CYRO http://southeasternflora.com/view_flora.php?plantid=2018
<i>Daucus carota</i>	wild carrot or Queen Anne's lace	https://plants.usda.gov/core/profile?symbol=DACA6 http://southeasternflora.com/view_flora.php?plantid=29
<i>Dichanthelium dichotomum</i>	dichanthelium or cypress panicgrass	https://plants.usda.gov/core/profile?symbol=DIDI6 http://southeasternflora.com/view_flora.php?plantid=2362
<i>Digitaria ciliaris</i>	southern crabgrass	https://plants.usda.gov/core/profile?symbol=DICI http://southeasternflora.com/view_flora.php?plantid=2513
<i>Digitaria ischaemum</i>	smooth crabgrass	https://plants.usda.gov/core/profile?symbol=DIIS http://southeasternflora.com/view_flora.php?plantid=2414
<i>Diodia teres</i>	poorjoe	https://plants.usda.gov/core/profile?symbol=DITE2 http://southeasternflora.com/view_flora.php?plantid=30
<i>Diospyros virginiana</i>	common persimmon	https://plants.usda.gov/core/profile?symbol=DIVI5 http://southeasternflora.com/view_flora.php?plantid=33
<i>Echinochloa crus-galli</i>	barnyardgrass	https://plants.usda.gov/core/profile?symbol=ECCR http://southeasternflora.com/view_flora.php?plantid=2504
<i>Eragrostis pectinacea</i>	tufted lovegrass	https://plants.usda.gov/core/profile?symbol=ERPE http://southeasternflora.com/view_flora.php?plantid=2443
<i>Erigeron strigosus</i>	daisy, prairie, or rough fleabane	https://plants.usda.gov/core/profile?symbol=ERST3 http://southeasternflora.com/view_flora.php?plantid=657
<i>Euphorbia dentata</i>	toothed spurge	https://plants.usda.gov/core/profile?symbol=EUDE4 http://southeasternflora.com/view_flora.php?plantid=1338
<i>Fraxinus pennsylvanica</i>	green ash	https://plants.usda.gov/core/profile?symbol=FRPE http://southeasternflora.com/view_flora.php?plantid=388

Appendix (Continued)

Plant Species That Can Be Found in This Report

Scientific Name (s)	Common Name(s)	Reference Websites*
<i>Gamochaeta purpurea</i> (Syn. <i>Gnaphalium purpureum</i>)	linear spoonleaf purple everlasting	https://plants.usda.gov/core/profile?symbol=GAPU3 http://southeasternflora.com/view_flora.php?plantid=339
<i>Geranium carolinianum</i>	Carolina geranium	https://plants.usda.gov/core/profile?symbol=GECA5 http://southeasternflora.com/view_flora.php?plantid=40
<i>Hordeum pusillum</i>	little barley	https://plants.usda.gov/core/profile?symbol=HOPU http://southeasternflora.com/view_flora.php?plantid=2263
<i>Juniperus virginiana</i>	eastern redcedar	https://plants.usda.gov/core/profile?symbol=JUVI http://southeasternflora.com/view_flora.php?plantid=417
<i>Kummerowia striata</i> (Syn. <i>Lespedeza striata</i>)	Japanese lespedeza	https://plants.usda.gov/core/profile?symbol=KUST2 http://southeasternflora.com/view_flora.php?plantid=2515
<i>Lactuca serriola</i> (Syn. <i>Lactuca scariola</i>)	prickly lettuce	https://plants.usda.gov/core/profile?symbol=LASE http://southeasternflora.com/view_flora.php?plantid=1280
<i>Lathyrus hirsutus</i>	hairy pod or caley pea	https://plants.usda.gov/core/profile?symbol=LAHI2 http://southeasternflora.com/view_flora.php?plantid=52
<i>Ligustrum sinense</i>	Chinese privet	https://plants.usda.gov/core/profile?symbol=LISI http://southeasternflora.com/view_flora.php?plantid=56
<i>Liquidambar styraciflua</i>	sweetgum	https://plants.usda.gov/core/profile?symbol=LIST2 http://southeasternflora.com/view_flora.php?plantid=59
<i>Lolium multiflorum</i> (Syn. <i>Lolium perenne</i> var. <i>multiflorum</i>)	annual or Italian ryegrass	https://plants.usda.gov/core/profile?symbol=LOPEM2 http://southeasternflora.com/view_flora.php?plantid=2130
<i>Lonicera japonica</i>	Japanese honeysuckle	https://plants.usda.gov/core/profile?symbol=LOJA http://southeasternflora.com/view_flora.php?plantid=62
<i>Lygodium japonicum</i>	Japanese climbing fern	https://plants.usda.gov/core/profile?symbol=LYJA http://southeasternflora.com/view_flora.php?plantid=281
<i>Mecardonia acuminata</i>	mecardonia or axilflower	https://plants.usda.gov/core/profile?symbol=MEAC http://southeasternflora.com/view_flora.php?plantid=443
<i>Nekemias arborea</i> (Syn. <i>Ampelopsis arborea</i>)	peppervine	https://plants.usda.gov/core/profile?symbol=NEAR5 http://southeasternflora.com/view_flora.php?plantid=5

Appendix (Continued)

Plant Species That Can Be Found in This Report

Scientific Name (s)	Common Name(s)	Reference Websites*
<i>Oenothera speciosa</i>	showy evening primrose	https://plants.usda.gov/core/profile?symbol=OESP2 http://southeasternflora.com/view_flora.php?plantid=75
<i>Panicum dichotomiflorum</i>	fall panicum	https://plants.usda.gov/core/profile?symbol=PADI http://southeasternflora.com/view_flora.php?plantid=2422
<i>Paspalum dilatatum</i>	dallisgrass	https://plants.usda.gov/core/profile?symbol=PADI3 http://southeasternflora.com/view_flora.php?plantid=456
<i>Paspalum notatum</i>	bahiagrass or water couch	https://plants.usda.gov/core/profile?symbol=PANO2 http://southeasternflora.com/view_flora.php?plantid=452
<i>Paspalum urvillei</i>	vaseygrass	https://plants.usda.gov/core/profile?symbol=PAUR2 http://southeasternflora.com/view_flora.php?plantid=1099
<i>Plantago aristata</i>	bracted plantain	https://plants.usda.gov/core/profile?symbol=PLAR3 http://southeasternflora.com/view_flora.php?plantid=85
<i>Plantago lanceolata</i>	buckhorn or narrowleaf plantain	https://plants.usda.gov/core/profile?symbol=PLLA http://southeasternflora.com/view_flora.php?plantid=86
<i>Polypremum procumbens</i>	rustweed or juniper leaf	https://plants.usda.gov/core/profile?symbol=POPR4 http://southeasternflora.com/view_flora.php?plantid=164
<i>Pueraria montana</i>	kudzu	https://plants.usda.gov/core/profile?symbol=PUMO http://southeasternflora.com/view_flora.php?plantid=96
<i>Quercus pagoda</i>	cherrybark oak	https://plants.usda.gov/core/profile?symbol=QUPA5
<i>Ranunculus sardous</i>	buttercup	https://plants.usda.gov/core/profile?symbol=RASA http://southeasternflora.com/view_flora.php?plantid=1536
<i>Rosa multiflora</i>	multiflora rose	https://plants.usda.gov/core/profile?symbol=ROMU http://southeasternflora.com/view_flora.php?plantid=610
<i>Rubus trivialis</i>	southern dewberry	https://plants.usda.gov/core/profile?symbol=RUTR http://southeasternflora.com/view_flora.php?plantid=299
<i>Rumex acetosella</i>	red sorrel	https://plants.usda.gov/core/profile?symbol=RUAC3 http://southeasternflora.com/view_flora.php?plantid=1480

Appendix (Continued)

Plant Species That Can Be Found in This Report

Scientific Name (s)	Common Name(s)	Reference Websites*
<i>Rumex crispus</i>	curly or yellow dock	https://plants.usda.gov/core/profile?symbol=RUCR http://southeasternflora.com/view_flora.php?plantid=105
<i>Salix nigra</i>	black willow	https://plants.usda.gov/core/profile?symbol=SANI http://southeasternflora.com/view_flora.php?plantid=302
<i>Sambucus nigra</i> (Syn. <i>Sambucus canadensis</i>)	common elderberry	https://plants.usda.gov/core/profile?symbol=SANIC4 http://southeasternflora.com/view_flora.php?plantid=109
<i>Scandix pecten-veneris</i>	Venus's comb or sheperdsneedle	https://plants.usda.gov/core/profile?symbol=SCPE
<i>Schedonorus arundinaceus</i> (Syn. <i>Festuca arundinacea</i>)	tall fescue	https://plants.usda.gov/core/profile?symbol=SCAR7 http://southeasternflora.com/view_flora.php?plantid=2493
<i>Schizachyrium scoparium</i>	little bluestem	https://plants.usda.gov/core/profile?symbol=SCSC http://southeasternflora.com/view_flora.php?plantid=1396
<i>Setaria parviflora</i> (Syn. <i>Setaria geniculata</i>)	knotroot foxtail or marsh bristlegrass	https://plants.usda.gov/core/profile?symbol=SEPA10 http://southeasternflora.com/view_flora.php?plantid=1101
<i>Sherardia arvensis</i>	field madder or blue field madder	https://plants.usda.gov/core/profile?symbol=SHAR2 http://southeasternflora.com/view_flora.php?plantid=354
<i>Sisyrinchium rosulatum</i>	annual blue-eyed grass	https://plants.usda.gov/core/profile?symbol=SIRO5 http://southeasternflora.com/view_flora.php?plantid=330
<i>Solanum carolinense</i>	horsenettle or Carolina horsenettle	https://plants.usda.gov/core/profile?symbol=SOCA3 http://southeasternflora.com/view_flora.php?plantid=117
<i>Solidago altissima</i>	Canada goldenrod	https://plants.usda.gov/core/profile?symbol=SOAL6 http://southeasternflora.com/view_flora.php?plantid=1142
<i>Solidago gigantea</i>	giant goldenrod	https://plants.usda.gov/core/profile?symbol=SOGI
<i>Symphyotrichum divaricatum</i> (Syn. <i>Aster exilis</i>)	slender aster	https://plants.usda.gov/core/profile?symbol=SYDI2
<i>Symphyotrichum pilosum</i> (Syn. <i>Aster pilosus</i>)	white heath aster	https://plants.usda.gov/core/profile?symbol=SYPI2 http://southeasternflora.com/view_flora.php?plantid=509
<i>Toxicodendron radicans</i> (Syn. <i>Rhus radicans</i>)	poison-ivy	https://plants.usda.gov/core/profile?symbol=TORA2 http://southeasternflora.com/view_flora.php?plantid=101

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Plant Species That Can Be Found in This Report

Scientific Name (s)	Common Name(s)	Reference Websites*
<i>Trifolium campestre</i>	large hop clover or field clover	https://plants.usda.gov/core/profile?symbol=TRCA5 http://southeasternflora.com/view_flora.php?plantid=312
<i>Trifolium dubium</i>	small hop clover or suckling clover	https://plants.usda.gov/core/profile?symbol=TRDU2
<i>Trifolium incarnatum</i>	crimson clover	https://plants.usda.gov/core/profile?symbol=TRIN3 http://southeasternflora.com/view_flora.php?plantid=131
<i>Trifolium pratense</i>	red clover	https://plants.usda.gov/core/profile?symbol=TRPR2 http://southeasternflora.com/view_flora.php?plantid=349
<i>Trifolium repens</i>	Dutch or white clover	https://plants.usda.gov/core/profile?symbol=TRRE3 http://southeasternflora.com/view_flora.php?plantid=132
<i>Urochloa platyphylla</i> (Syn. <i>Brachiaria platyphylla</i>)	broadleaf signalgrass	https://plants.usda.gov/core/profile?symbol=URPL2 http://southeasternflora.com/view_flora.php?plantid=2397
<i>Verbena brasiliensis</i>	Brazilian vervain	https://plants.usda.gov/core/profile?symbol=VEBR2 http://southeasternflora.com/view_flora.php?plantid=138
<i>Veronica arvensis</i>	corn speedwell	https://plants.usda.gov/core/profile?symbol=VEAR http://southeasternflora.com/view_flora.php?plantid=1405
<i>Vicia sativa</i> (Syn. <i>Vicia angustifolia</i>)	common, narrow-leaf or garden vetch	https://plants.usda.gov/core/profile?symbol=VISAN2 http://southeasternflora.com/view_flora.php?plantid=141
<i>Vicia villosa</i>	hairy vetch	https://plants.usda.gov/core/profile?symbol=VIVI http://southeasternflora.com/view_flora.php?plantid=315
<i>Vitis rotundifolia</i>	muscadine grape	https://plants.usda.gov/core/profile?symbol=VIRO3 http://southeasternflora.com/view_flora.php?plantid=185
<i>Vulpia myuros</i> (Syn. <i>Festuca myuros</i>)	rattail fescue	https://plants.usda.gov/core/profile?symbol=VUMY http://southeasternflora.com/view_flora.php?plantid=2267

*PLANTS.USDA.gov and/or SoutheasternFlora.com URL's are included for each plant species to provide access to additional information, such as images and habitat information.



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